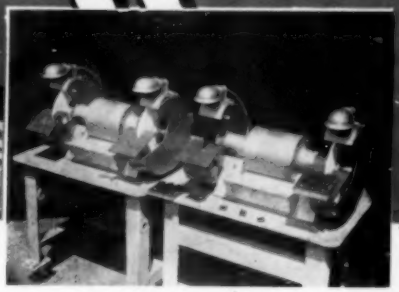
WOOD WORKING Digest



AUGUST 1954

Complete Index 5
Washington News 35
Feature Articles .....51 - 89
Finishing Section 115
Veneer & Plywood Section 137
Products Index 220
Advertisers Index 222

A HITCHCOCK PUBLICATION

Acceptance under Section 34.64, P.L.&R., authorized

WOOD WORKING DIGEST

222 E. Willow Ave. Wheaton, Ill.

Form 3547 Requested Return Postage Guaranteed

UNIVERSITY MICROFILMS
ATT MR EUGENE B POWER
313 NO FIRST ST
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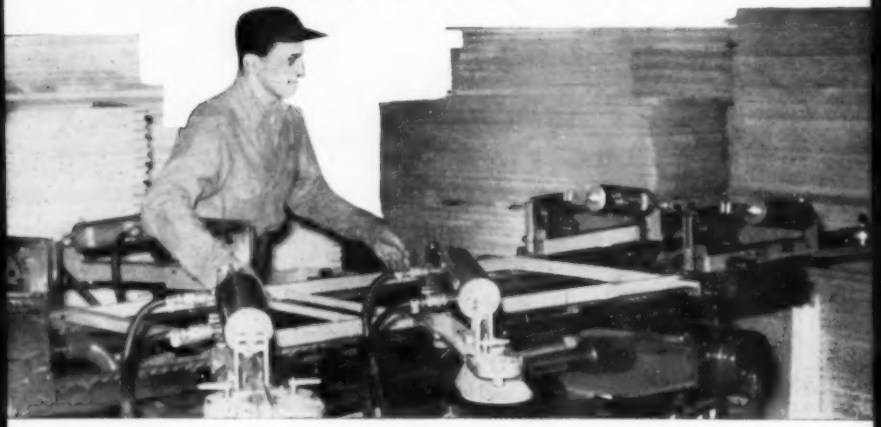
NOW . . . *a complete* PIN SASH in ONE SECOND!

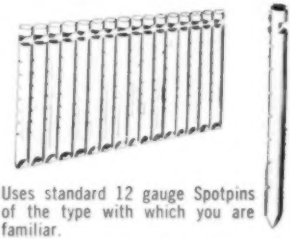
with SPOTNAILS compact automatic set-up



Individual pinning units mount on your own sash clamp. Easily adjustable . . . easily detachable.

Slap your sash—as usual—into your clamp. One pneumatic valve action brings all the heads in over the sash to pin—and to snap back out of the way for easy lift-out of the pinned sash. Simple—uncomplicated.

235 Completed frames before easy reloading of pins. Red light announcement of time to reload.



Uses standard 12 gauge Spotpins of the type with which you are familiar.

Now being used in actual production.

Practical millwork men approve it.

Write for details—and tell us what model sash clamp you use.

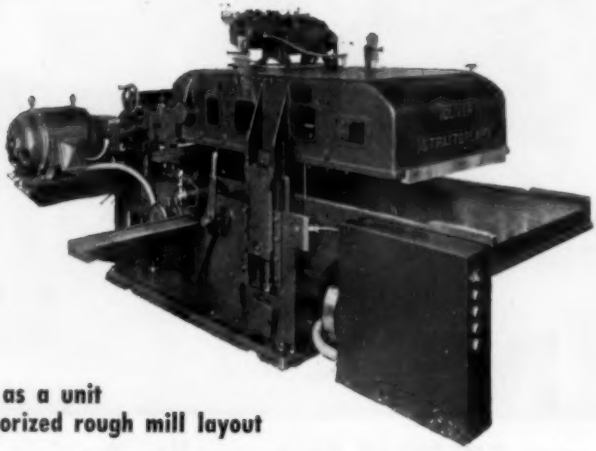
Patents Applied For

SPOTNAILS, INC.

Evanston 1, Illinois

In one operation

the "Oliver" Straitoplane planes raw stock out-of-wind...both sides smooth and parallel



Unmatched as a unit in a conveyorized rough mill layout

Write for Bulletin No. 170 containing complete information on the Straitoplane

The efficient production of the "Oliver" Straitoplane is unmatched. It does the work of two buzz planers and one surfacer . . . and does it better and faster!

It planes out as much as ½-inch on each side of the stock at speeds up to 90 feet a minute. The bottom side is face jointed, and top side planed smooth, straight and parallel to the bottom. The finished board or panel is perfectly flat, level and true.

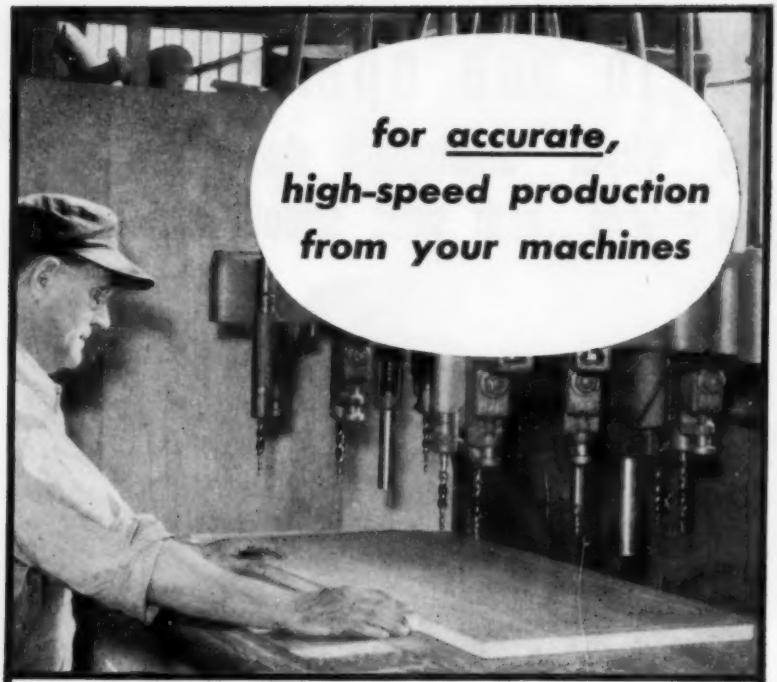
The Straitoplane takes stock up to 8' long, from 1½" to 36" wide, from ½" to 6" thick. It planes pieces as short as 12" when fed continuously, and as short as 16" when fed singly. Used by leading woodworkers for high production.

OLIVER

OLIVER MACHINERY COMPANY

Established 1890

GRAND RAPIDS 2, MICHIGAN



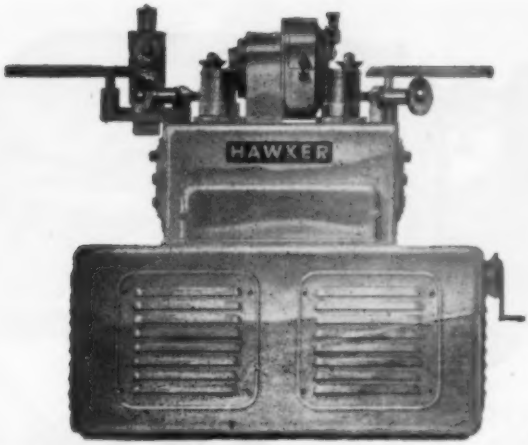
get GREENLEE high-quality boring tools

Produced by the makers of fine woodworking machines, GREENLEE boring tools are designed and built specifically to handle fast work . . . stand up under long, hard usage . . . bore clean. Each tool has accurate sizing, sharp cutting edges, proper heat-treating to bring you high-speed, highly accurate production. Line includes Machine Bits, Machine Drills, Dowel Bits and Drills, Countersink Bits and Drills, Multi-Spur Machine Bits, Expansive Bits, Plug Cutters, Relishing Bits, and others. To get the finest results from your machines "get GREENLEE." Write today for Catalog 34-M with complete data.

GREENLEE

GREENLEE TOOL CO., Division of Greenlee Bros. & Co., 2138 Herbert Ave., Rockford, Ill.

Boring Tools • Hollow Chisels and Bits • Hollow Chisel Sharpeners • And many others • Teco Grooving Tools for Timber Construction • GREENLEE Woodworking Machines include Tenoners • Saws • Mortisers • Borers • Planers • Shapers



BEST DEAL IN WOODWORKING MACHINERY

AND NOW'S THE TIME TO BUY

The money being wasted on obsolete equipment can be put to work paying for fast, modern Hawkers and earning profits as well!

The new Hawker rod turning machine is today's most productive, profitable investment in the field.

BEST PERFORMANCE: A precision heavy-duty machine. Versatile. Minimum maintenance. Maximum economy.

BEST PRICE: Only $2,995 (F.O.B. Dayton, Ohio) for Model 1000 Hawker Rod Turning Machine complete with motors.

BEST TRADE-IN: Your old rod turning machine may make the down payment on a new Hawker!

BEST TERMS: Reasonable financing available. Only 25% down!

BEST DELIVERY: Within 30 days—thanks to our new facilities and volume production.

WRITE TODAY FOR NEW HAWKER MANUAL

HAWKER

MANUFACTURING CO.

1449 KEOWEE STREET, DAYTON 4, OHIO

MACHINES FOR THE NEW AGE OF WOOD

BEACH No. 9 Precision Sander for PLASTICS METALS WOOD

A precision built machine for finishing plastics, metals or wood to extremely close tolerances. Speeds production and assures uniformly finished surface over entire sheet. Will feed material from 1/32 inch to 6 inches. Available in several sizes, ranging from 24 inches to 54 inches.

Write for Free Folder

BEACH

MANUFACTURING CO. MONTROSE PA

WOOD WORKING Digest

AUGUST, 1954
Vol. 56, No. 8

SPECIAL FEATURES

How to Grind Woodworking Knives 51
"Shoestring" Begins Shakes Enterprise 70
Evolution of Lumber Drying 75
Wood Fiber Moldings are New Venture 89
Furniture Manufacturing—A Craft with Tradition 95

FINISHING SECTION

Styles in Furniture Finishes 115

SAFETY SECTION

Good Housekeeping in Furniture Plants 131

Veneer & Plywood Section

Veneer and Plywood Machinery 139

DEPARTMENTS

The Editor's Page 33
Comments from the Nation's Capital 35
Pointed Paragraphs 42
Kiln Drying Forum 105
Industry Notes 175
New Literature 181
The Market Place 184
Buyers Page 186
New & Used Machinery Dealers 198
Equipment and Supplies 201
Help Yourself 217
Mechanics Through the Ages 218
Products Index 220
Index to Advertisers 222

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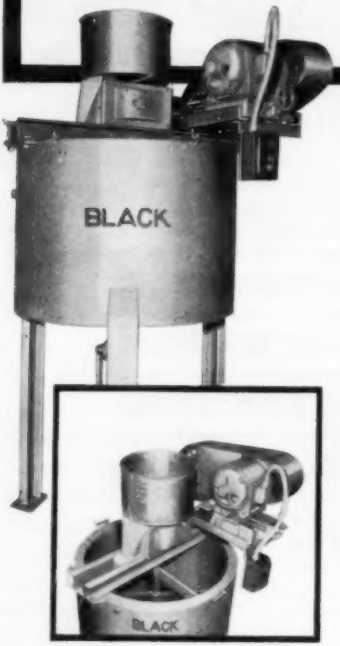
MEMBER
BPA

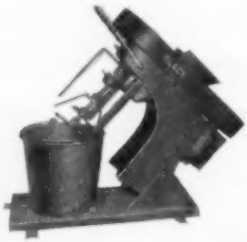
THE BLACK BROTHERS

Cold Glue Mixers

FOR POWDERED OR LIQUID ADHESIVES



The Black Brothers stationary cold glue mixers are made in a full range of capacities from 10 to 500 gallons. They are the result of expert engineering combined with years of practical experience in glue equipment manufacturing. Their many features include: (1) Sifter for glue powder (2) *Double agitators which give a beating action resulting in the smoothest possible mixture in the least possible time* . . . see close-up on left (3) Pressure lubrication (4) Cut steel gears . . . hardened and lapped (5) Large quick-acting valve at bottom. Optional equipment includes (1) water jacket (2) variable speed drive. For full information write today for Bulletin 11-1.



The Black Brothers portable motor driven cold glue mixer is made in 2, 5, 7½, and 15 gallon sizes. It has a number of exclusive Black Brothers features such as glue powder sifter, two-way agitation, and specially shaped flat paddles to give a beating action to the agitator. In addition this mixer has a hinged arm that swings up to allow the pail to be inserted or removed. Write for Supplement to Bulletin 11-1.

"If it Is Gluing Equipment—We Have It"

THE BLACK BROTHERS CO., INC., Mendota, Illinois

THE SMITH

ENDLESS BED SANDER

WITH SELF-OSCILLATING DRUMS AND VARIABLE SPEED DRIVE, 12' TO 35' PER MINUTE

The self-oscillating mechanism (Patented) is the greatest improvement in drum sander construction in many years. Eliminates the multi-jointed, old style oscillator, with its bulky cover and separate motor drive. Operator now can get close to the machine for changing paper, making change in less than five minutes.

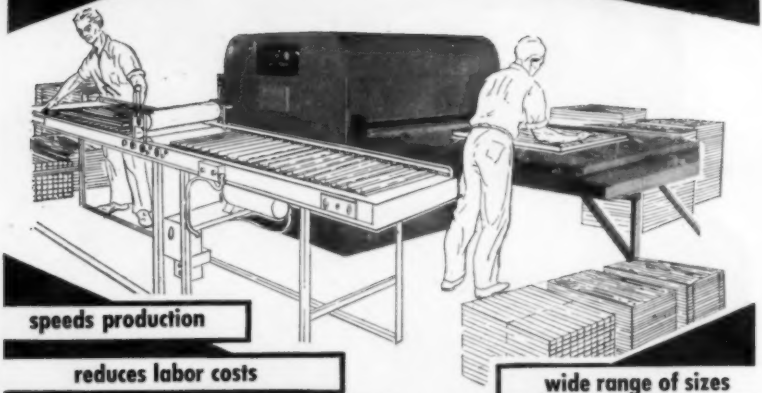
AND YOU CAN ARRANGE FOR A 5 YEAR LEASE, TOO!

Write today for descriptive literature

H. B. SMITH MACHINE CO.

SMITHVILLE, NEW JERSEY

RAYBOND shuttle-type PANEL ON FRAME PRESS



speeds production

reduces labor costs

only two operators

wide range of sizes

reversible glue spreader

Case history shows production of more than 1000 medium size panels per 8 hour working shift with two girl operators.
Completed panels are ready for immediate use, eliminates need for storage area.
Compactness of design of installation utilizes a minimum of floor space.
Raybond processes panels of a wide range of thicknesses.
A complete Raybond installation — press, high frequency and material handling equipment — designed, manufactured, sold and serviced by one responsible source.

ELECTRONIC HEATING CORP.

66 Needham St. Newton Highlands, Mass.

Whitney

FOR FINEST PERFORMANCE

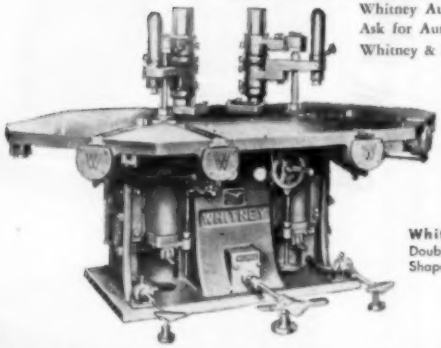
MODERNIZE
for greater profits

Modernization is the key to lower costs, greater production, more profits. Today's machines pay big dividends in the elimination of waste in man-hours and materials and in stepping up production to a more profitable basis.

For 117 years Whitney machines have been the leaders in quality work, dependable production, and fine performance. And today — they offer greater flexibility, faster feeds, and more efficient operation.

Investigate the superior advantages of Whitney Automatic Shapers — designed to give you greater production and the highest quality shaping.

Old machines are slow, inefficient and costly to operate. Why wait to modernize! Write, wire or phone us today. Get full particulars on how Whitney Automatic Shapers can save you money. Ask for Automatic Shaper bulletin D8. Baxter D. Whitney & Son, Inc., Winchendon, Mass.



Increase your Profits with WHITNEY Woodworking Machines

Whitney 302 Automatic Shaper
Double and Single Spindle Automatic Shapers in sizes for every shaping need.

PLANERS

SHAPERS

FACERS

VARIETY SAWS

BACK KNIFE LATHES

Geared to Serve the Woodworking Industry — In Our 117th Year

SOME NEW DATA

The plastic dinette industry has grown so tremendously that it is now a significant factor in the woodworking field. Recently, the demand for plastic-laminate surfaces has carried over into fields previously dominated by wood. Plastic-surfaced case goods, occasional tables, and formal dining room tables are only the forerunners of this new styling in modern furniture.

Two problems confront every manufacturer: Volume production and cost savings. While there are many machines to aid in the rapid production of finished plastic laminations, the greatest obstacle has been the inability of old style gluing processes to feed sufficient laminated material to the production line.

A new 4-page leaflet: RECENT ADVANCES IN PLASTICS LAMINATIONS, contains some very valuable volume production and cost saving information. Copies on request.

I'm Interested

Dept. WD

Please send _____ free copies of National's leaflet:

RECENT ADVANCES IN PLASTICS LAMINATIONS.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Address: NATIONAL ADHESIVES, 270 Madison Ave., New York 16; 3641 So. Washtenaw Ave., Chicago 32; 735 Battery St., San Francisco 11.

CALIFORNIA REDWOOD

For Millwork

The millwork manufacturer who is looking for a versatile, workable, salable material for both production line and specialty work will find the right answer in Redwood.

Because of its unique combination of desirable properties—light weight, strength, durability, dimensional stability, beauty of grain and color, nail- and glue-holding power—Redwood has hundreds of uses in the millwork plant. Three such uses are pictured here.

LOUVERED CEILING requires a wood that will work easily and hold its shape perfectly.

REDWOOD ROOM DIVIDER takes advantage of Redwood's light weight and adequate strength.

Perhaps Redwood can help you do *your* job better. Why not find out, by writing the California Redwood Association, 576 Sacramento St., San Francisco 11.

ARCHITECTURAL DECORATION requires the highest degree of workability, dimensional stability and paint retention.

The Association, a clearing house of Redwood data, is maintained by fifteen leading Redwood mills: The Pacific Coast Co., The Pacific Lumber Co., Rockport Redwood Co., Simpson Logging Co., Union Lumber Co., Warm Springs Redwood Co., Willits Redwood Products Co., Wolf Creek Timber Co., Inc., Arcata Redwood Co., Eureka Redwood Lumber Co., Hammond Lumber Co., Holmes Eureka Lumber Co., Hulbert & Muffly Lumber Mill, M & M Wood Working Co., Northern Redwood Lumber Co.

Choose the right sander

ONLY **NATIONAL** OFFERS A COMPLETE LINE

MODEL 600

Single-Pad . . . Air Driven

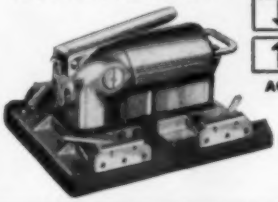
STRAIGHT LINE

ACTION

MODEL 300

Two-Pad . . . Air Driven

STRAIGHT LINE



ACTION

MODEL 400

Single-Pad . . . Air Driven

ORBITAL

ACTION

MODEL 500

Single-Pad . . . Electric

ORBITAL

ACTION

EASILY ADAPTED TO YOUR FINISHING METHODS

NATIONAL NS SANDERS

National Sanders can be adapted to your present finishing methods to speed production and yet give your product a distinctive appearance. We offer a wide selection of block sanders, one of which will fit your requirements. Whether you prefer orbital or straight-line action, single or double pads for rubbing or sanding, there is a National Sander for you.

Write for Catalog today!

NATIONAL AIR SANDER, INC., 2822 Auburn St., Rockford, Ill.

It takes the UNSEEN as well as the seen to make good furniture

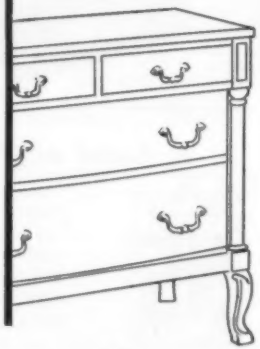
Considerable veneer is used in the construction of drawer bottoms, backing and crossbanding.

The public never sees this, but it is necessary to keep the exterior finish beautiful for its lifetime. A good stock of Oak and Mahogany veneer, ideal for drawer bottoms, is always available at Stem's.

Quarter and flat sliced Poplar, excellent for crossbands because it holds a panel flatter than rotary cut, is also available.

And don't forget, we can supply fine veneers in all the popular woods for exterior finish.

So call on Stem for both the unseen and seen veneer.



Chester B. Stem, Inc.
538 GRANT LINE ROAD
NEW ALBANY, INDIANA

Customers Expect More From STEM and They Get More

These higher grades of VENEER and LUMBER manufactured and available at all times

American Walnut . . . Avodire . . . Hard Maple . . . White Ash . . . Yellow Poplar . . . Cherry . . . Indiana Soft Texture White and Red Oak . . . Butternut . . . Birch . . . Prima Vera . . . Honduras and African Mahogany . . . Knotty Pine . . . Teak . . . English Yew . . . Satinwood . . . Zebra Wood . . . Special logs and thicknesses for special places . . . lumber from modern dry kilns.

Wabash HARDWOOD SLIDES

smooth, quiet operation

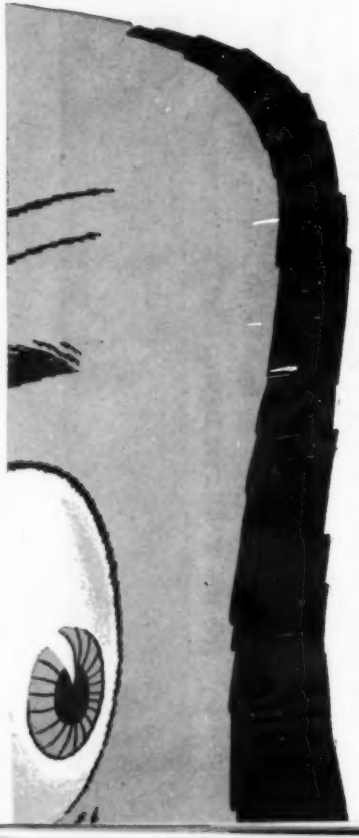
BUILDS MORE SALES FOR YOUR TABLES

HOUSEWIVES judge your tables by the ease with which they operate. Make sure of smooth action by equipping them with Wabash Slides and equipment. Write today for more information.

it's the WABASH DESIGN THAT COUNTS

B. WALTER & CO., Inc., WABASH, INDIANA

Walter of Wabash



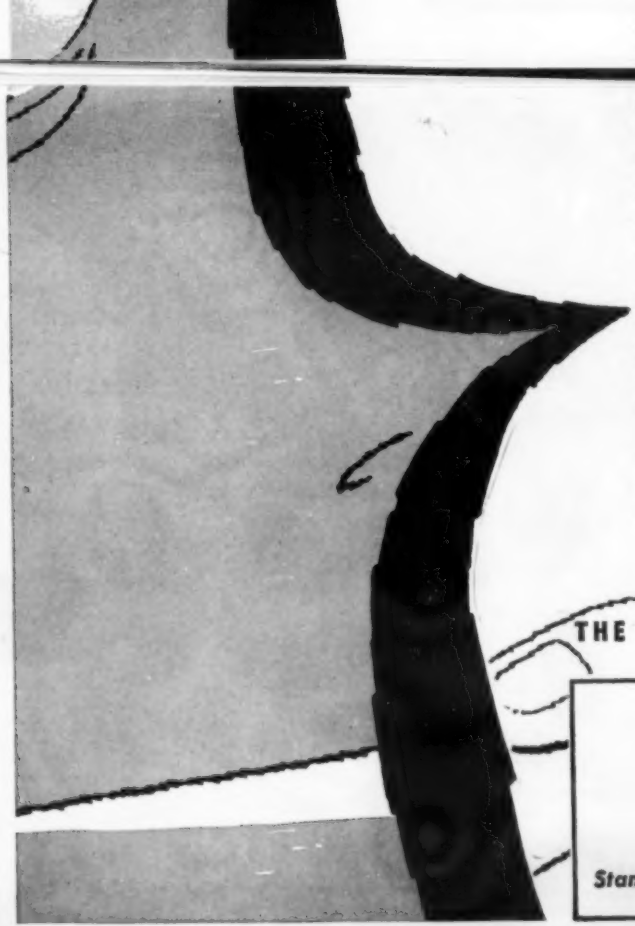
Ok — save some money on machinery budgets...

but where will it get you?

Obsolete machinery *eats* into your profit margin . . . for it *cannot* fit into a mass-produc-

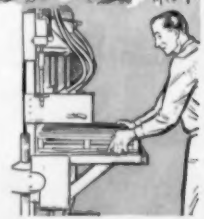
and labor, and higher rejects, are the burden of a machine

your profit margin . . . for it *cannot* fit into a mass-produc-



and labor, and higher rejects, are the burden of a machine that needs retiring. *Why lose profits?* Delaying replacement of an obsolete machine may be *robbing* you of them.

Modern Diehl Woodworking Machines produce more units at less cost. Why not invite your exclusive Diehl Woodworking Representative into your plant . . . and let him *prove* to you that modern Diehl machinery is an *investment in profits* . . . NOW, *and for the future!*



THE G. M. DIEHL MACHINE WORKS, INC.
Wabash, Indiana, U. S. A.

Diehl

Standard of Comparison in the Woodworking Industry

Armor in into a mass-produc-

"We needed a glue that wouldn't be greatly affected by Gulf Coast weather conditions. We got it from Armour!"

Richard Dishinger, Plant Production Mgr.
Myers-Spalti Mfg. Co., Houston, Texas

"Temperatures and humidity conditions vary greatly and rather suddenly here along the Gulf Coast. In our type of construction, and by using solid woods, the use of the correct glue is one of the most important factors, due to the many glued joints that are required in our case goods. This calls for an adhesive that is not greatly affected by these varied conditions. We have found that Armour 'B B' hide glue is superior in every respect."

Armour "B B" hide glue is specified by Myers-Spalti for their complete line. They know they can depend on the unfailing high quality of this time-tested glue—and on the strong joints it produces (shear strength up to 3500 lbs. per square inch). "B B" has a wide working range, because it is less critically affected by such variables as temperature and humidity. And "B B" hide glue is unvarying in quality, from batch to batch, assuring a uniform operation.

Armour "B B" hide glue is only one of a complete line of Armour woodworking adhesives, including polyvinyl resin emulsions. Get in touch with Armour today for current prices.

ARMOUR *Adhesive Division*

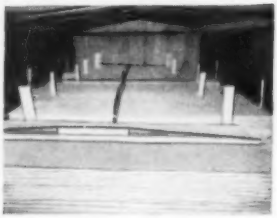
Armour and Company • 1355 West 31st Street • Chicago 9, Illinois
Delaware and Spring Garden Streets • Philadelphia 23, Pennsylvania
50 Farnsworth Street • Boston 10, Massachusetts
120 Broadway • New York 5, New York

armour it into a mass-produc-

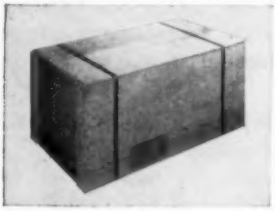
Let Signode show you how to

- **get better shipping protection**
- **lower packaging, handling costs**

Ship furniture?
Ask a Signode fieldman* to show you methods in packaging, protecting and shipping in containers reinforced with steel strapping that pay for themselves.



Ship plywood?
Want to lick bracing failures, side shifting, interlocking, scraping, end splitting? We'll send a fieldman* to show you how to do it!



Ship parts or assemblies?
If you ship component parts of wood manufactured items, such as hardware in bundles, boxes or crates . . . singly or unitized on pallets, our fieldman* will bring you tested and approved anti-pilferage packaging methods.

Ship millwork, dimension?
Bundling such products as KD millwork, screens, ladders, doors, dimension lumber in all sizes and lengths, KD furniture and trailer sections can be done at lower cost. Ask a Signode fieldman* for the right bundling methods.

*SIGNODE FIELDMAN . . . the man with the answers to your quest for more economical packaging, handling and protective shipping methods . . . can be reached by writing

SIGNODE **STEEL STRAPPING COMPANY**
2655 N. Western Ave., Chicago 47, Ill.

SIGNODE

this seal means security in shipping

Offices Coast to Coast.
In Canada: Canadian Steel Strapping Co., Ltd. Montreal • Toronto • Winnipeg • Vancouver
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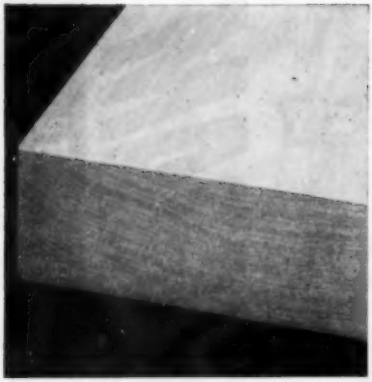
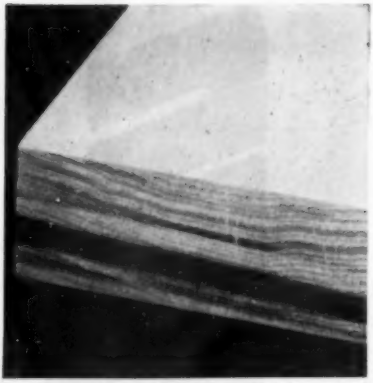


A Three-M-ite type belt did this perfect end grain edge-sanding job after 36 hours use, and belt still has a lot of cutting life left.



Ordinary edge-sanding belt, used for only 6 hours, scorched the end grain of this test panel—belt is now worthless.

STOP WOOD BURNING!

3M Belts give longer burn-free edge sanding

These pictures prove the amazing superiority of Three-M-ite type belts, which actually last up to *six times* longer than ordinary edge-sanding belts!

In this shop test, a Three-M-ite type belt and an ordinary edge-sanding belt were run to their end point. The belts were used on identical machines, the same kinds of wood were sanded. The ordinary edge-sanding belt dulled fast—after only 6 hours operation it started scorching the wood. The Three-M-ite type belt actually lasted for *37½ hours*, more than six times as long!

Reason for this amazing result is the extra sharpness of Three-M-ite belts. They cut faster, resist filling and loading, and produce finer finishes. And they operate cooler, because they are unaffected by the extreme heat generated in edge-sanding.

Yes, for best edge-sanding results, always use Three-M-ite belts . . . and be sure to specify 3M every time you order. For complete information, write for booklet, "3M System of Furniture Finishing," using coupon below.

3M ABRASIVES

The final finish mirrors all previous operations

Made in U. S. A. by Minnesota Mining and Manufacturing Company. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing.

Minnesota Mining and Mfg. Co.
Dept. WWD-84, St. Paul 6, Minn.

☐ Send me the booklet "3M System of Furniture Finishing"

☐ I'd like to talk to a 3M Salesman

Name_____ Title_____

Company_____

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City_____ Zone____ State_____

Fay & Egan Announces TOOL-LEASE PROGRAM

FAY & EGAN TOOL LEASE PROGRAM OFFERS YOU ALL THREE

USE OF MODERN HIGH SPEED PRODUCTION MACHINES

A FLEXIBLE PLAN

A WIDE VARIETY OF TOOLS MANUFACTURED BY WORLD'S OLDEST MANUFACTURER OF WOODWORKING MACHINERY

without expanding capital

- A five year lease

- Table Saws

. . . without expending capital

. . . without impairing borrowing capacity

. . . without expense of exceptional depreciation

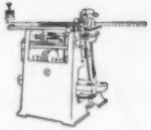
. . . without long term investments

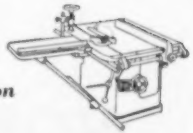
. . . without sacrificing flexibility of production requirements

. . . without going into debt

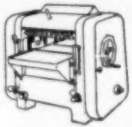
- A five year lease
- Cancelable at end of any year
- Low rentals
- Options to purchase at depreciated values
- Lease renewal at end of 5 years

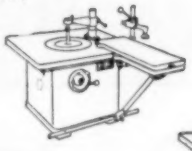
- Table Saws
- Band Scroll, Rip and Resaws
- Jointers—Surfacers
- Moulders—Matchers
- Shapers—Tenoners
- Borers—Mortisers
- Miterers—Trimmers Rod Machines

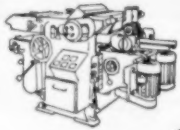


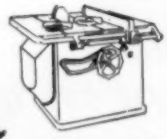


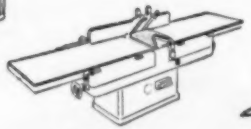
A Fay & Egan sales engineer will be pleased to study your requirements and give you specific information regarding the F. & E. Tool Lease Program. Write, wire or phone, Fay & Egan 2023 Eastern Avenue, Cincinnati 2, Ohio, Phone PLAZA 0730.

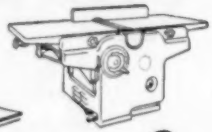


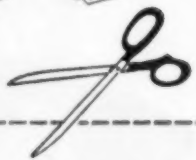












Ask about our deferred payment plan, also.

The FIRST LEASING PROGRAM EVER OFFERED THE WOODWORKING INDUSTRY

FAY & EGAN, 2023 EASTERN AVE., CINCINNATI 2, OHIO

NAME_____

TITLE_____

COMPANY_____

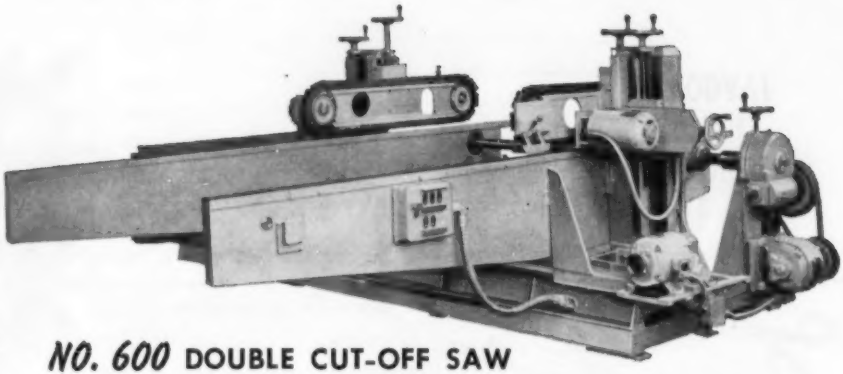
ADDRESS_____

CITY_____

ZONE_____ STATE_____

FILL OUT AND MAIL TODAY!

These new Mereen-Johnson double end machines are priced well within reach of most furniture, sash and door and allied plants. They have the quality and workmanship of the heavy duty units but, through the elimination of less essential features, are *much lower in price.*



NO. 600 DOUBLE CUT-OFF SAW

Available with trims only; or with tilting cope motors and stationary dado arbor. Special attachments are available as optional equipment.

TWO NEW MEREEN-JOHNSON DOUBLE END MACHINES . . .

priced right for small and medium sized plants

NO. 700 DOUBLE END TENONER

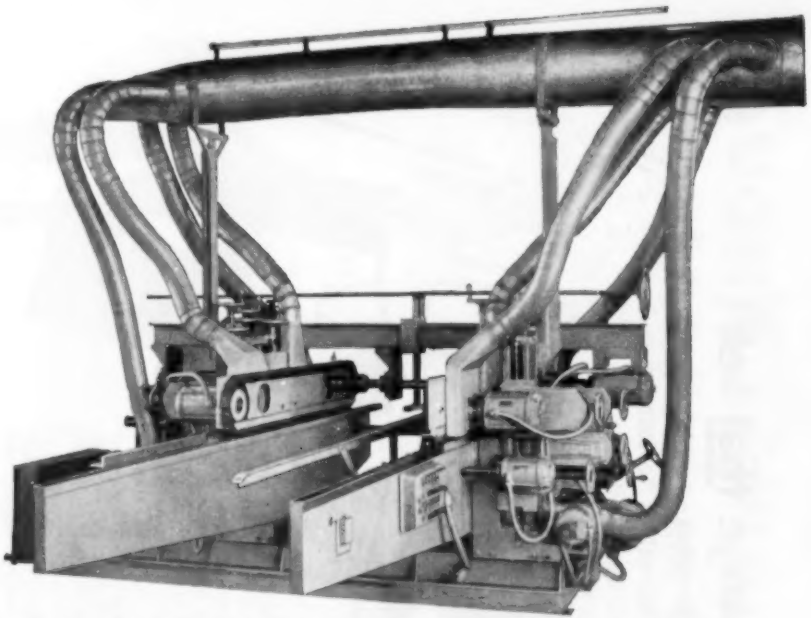
Comes standard with trim, tenon and cope motors. Can be furnished with overhead dado arbor and scoring saws.

The basic construction for

Comes standard with trim, tenon and cope motors. Can be furnished with overhead dado arbor and scoring saws.

The basic construction for both machines includes a welded steel base, chain beams and hold-downs. More compact, they afford easy access to adjustments—minimizing shutdown time for set-up changes. Both units are fully motorized and are completely modern in every respect.

For complete specifications, write for illustrated bulletin No. 600-700



MEREEN-JOHNSON MACHINE CO.

4401 LYNDALE AVE. NO. • MINNEAPOLIS 12, MINNESOTA

CUT-OFF SAWS	DOUBLE CUT-OFF SAWS	MULTIPLE CUT-OFF SAWS	GANG RIP SAWS
TENONERS	VENEER & PLYWOOD SIZERS & JOINTERS		RESAWS

Don't change that belt!

It's Armour's Garalun – precision-made with tougher abrasives to last longer!

Extra mileage is where you save money on sanding. Armour's Garalun Paper Belts give you that extra mileage because they're *precision*-made! Every tough grain is *electrocoated* firmly and uniformly into the adhesive. The adhesive is Armourclad, a powerful bond that holds the abrasive rigid – under high speeds, hard use, and heat. And the splice is even for level sanding and extra mileage. But that's just how one Armour product saves you money.

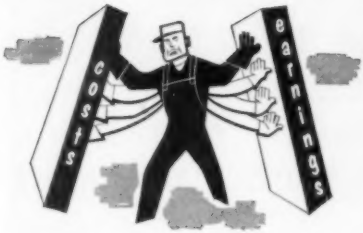
Armour Garnet discs, belts, rolls, and finishing papers last longer than ordinary abrasives because they're *heat-treated!* This scientific tempering process developed by Armour improves the lasting quality and cutting efficiency of Garnet grains. This same *heat-treating* process has extended sandpaper life, produced finer finishes, and cut sanding costs.

Here's how to select the economical Armour Coated Abrasive that *you* need from our complete line. Write on your letterhead to the address at right. Our salesman, who is an expert at reducing sanding costs, will call on you and help you choose the Armour abrasive that will last longer and save you money. Write us today.

ARMOUR *Coated Abrasives*

Armour and Company • North Benton Road
Alliance, Ohio

ROUGHY... fights the squeeze between costs and earnings!



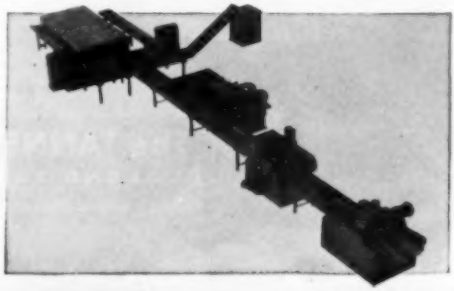
"Roughy" is a fighter with a knock-out punch for costs. "Roughy" is a wrestler who constantly wrestles that squeeze between costs and earnings.

"Roughy" is the nickname for Porter-Method-Rough-Mill-Systems, a nickname used by rough mill operators who know what he can do for them.

"Roughy" is an engineer and can use his head as well as his strength in fitting the flexibility and versatility of "PORTER METHOD" Systems to each particular rough mill operation.

"Roughy" is built for service, and he's smooth. He knows how to eliminate confusion and congested areas, and how to conveyorize your operations so that many men can be freed from production lines for other work.

"Roughy" is a helpful consultant and salesman, and can present the complete story of "PORTER METHODS" Systems so that you can discover ways to save thousands of dollars each year in your own wood working plant.



Please send my copy of "More Board Feet Per Day" which tells me how to fight that squeeze between costs and earnings.

C. O. PORTER
MACHINERY CO.
666 Front Ave., N.W., Grand Rapids 4, Mich.

Buy Tannewitz

for the BEST in

LABOR-SAVING DESIGN, CONVENIENCE—ACCURACY

and ADDED YEARS of TROUBLE-FREE SERVICE

MODEL XJ

(stationary table) may be had with five alternative tables, to give you a machine which is virtually custom built to provide the last degree of efficiency on your particular type of work. Below: Model XJS—with sliding left section table.

The Model "XJ" Mitre Saw Bench is a good example of Tannewitz's advanced designing for convenience and labor saving. You can get it in the table combination that exactly suits your production requirements. There's nothing like it. But whether you select the "XJ" or one of the others in the Tannewitz line, ranging from the relatively inexpensive to the finest ever devised, you will find that your money buys more in labor-saving conveniences, accuracy and added years of perfect service than you will get in any other machine. Ask the men who own and use them. For more than 60 years Tannewitz Mitre Saw Benches have been universally acclaimed the finest and best values on the market. Let us help you select the one best suited to your production requirements. Drop us a line for complete information.

The TANNEWITZ WORKS

GRAND RAPIDS, MICHIGAN

SAWING MACHINERY SPECIALISTS

☎ GL-6-1729

XJSW — with extended table at right

XJSW — with J-430 extended sliding table at left

XJW — with J-420 removable roll-table at left

For plenty of "spring" all summer long

this diving board was laminated with PENACOLITE® ADHESIVES

● It takes a lot of strength to keep a diving board "springy" all season, year after year. This new board, made by Rilco Manufacturing Co., and now in use at the Longue Vue Country Club, near Pittsburgh, was laminated with "Penacolite" adhesives. That means it *has* all the strength and stamina needed to take the repeated vibrations and strain from bouncing weight to which a busy diving board is subjected. "Penacolite" bonds are not weakened by such abuse. *And they are completely waterproof.*

Versatile "Penacolite" adhesives are excellent for any type of wood bonding job. They are recommended also for many thermo-setting and thermo-plastic materials and for natural and some synthetic rubbers. Write today for our free descriptive booklet on the various "Penacolite" Resorcinol Adhesives and their wide range of application.

KOPPERS COMPANY, INC.

Chemical Division, Dept. WWD-84, Koppers Bldg., Pittsburgh 19, Pennsylvania

KOPPERS®

PENACOLITE® RESORCINOL ADHESIVES

The original waterproof, room-temperature-setting adhesives

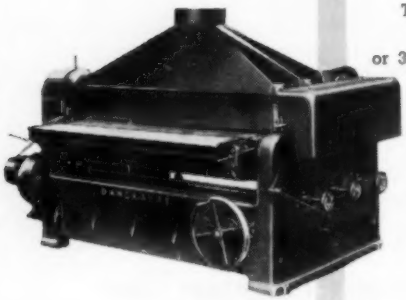
FOR A PERFECT SANDING JOB

ON EVEN THE SHORTEST PIECES

Long or short, every piece the Danckaert handles comes through to a perfect finish. You'll find the Danckaert has every advantage of more expensive machines, plus a talent all its own for sanding small work. And, it's priced within the reach of every shop.

Fine furniture makers around the world have used the Danckaert for years, and, its low initial cost, low upkeep, and fine performance still bring enthusiastic letters from them. You can enjoy these advantages and more for your sanding operation too.

the DANCKAERT ENDLESS BED SANDER



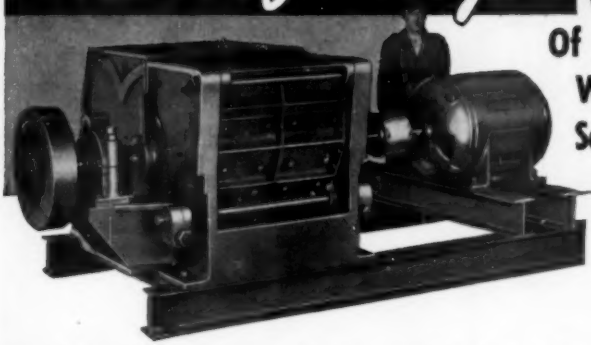
The Danckaert is available in belt or motor driven models, with 2 or 3 drum. Belt-driven models operate by a single belt automatically tensioned by the weight of the motor, placed on a hinged platform attached to the machine. Automatic expanding action of the spiral drums keeps the sand paper properly tightened. Two drum models 25″, 40″ and 50″ wide; three drum models 40″, 50″ and 66″ wide.

Write today for illustrated circular.

SUPREME WOODWORKING MACHINERY CORP.
50-52 HOWARD STREET • NEW YORK 13, N.Y.

WILLIAMS "No Nife" Hogs

Save Up To 75% Of The Cost Of Handling Wood Scrap!



Handling and disposal expense of waste wood can be cut as much as 75% by reducing it to chips in a Williams Hog. If handled manually, one man alone can move as much tonnage as three men could handle if scrap is in long strips or awkward shaped pieces. If handled automatically, top efficiency can be obtained only if wood is first reduced to chips.

In chip form, waste wood produces the greatest heat value. Unhogged waste cannot burn evenly because jumbled distribution of small and large pieces restricts air flow, smothers the fire, creates excessive smoke. Hogged wood chips control passage of air for even and complete combustion, yield more BTU's.

Savings in a few months will pay for an automatic installation for conveying wood waste to stoker or boiler.

WILLIAMS LINE IS COMPLETE

• Hogging, Grinding and Shredding Machines • Vibrating Screens • Air and Mechanical Separators • Conveying Systems • Cyclone Collectors • Complete "Packaged" Plants

Write For Complete Brochure

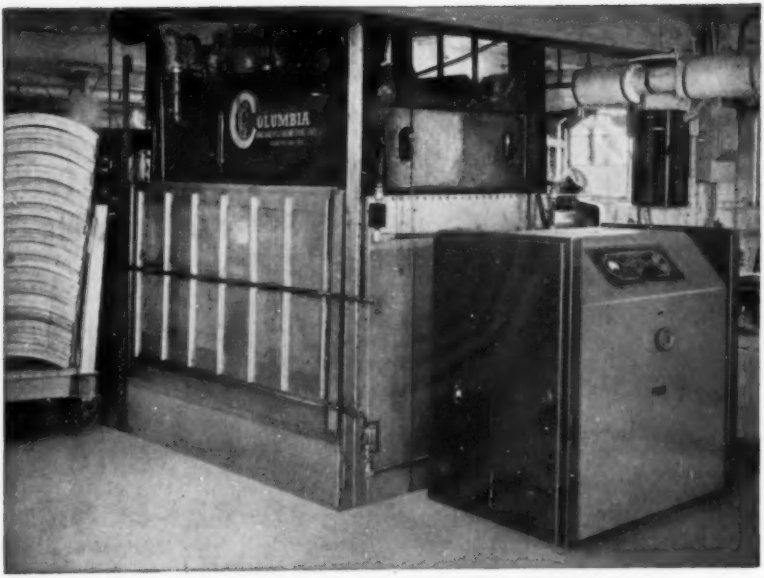
WILLIAMS PATENT CRUSHER & PULVERIZER CO.

808 St. Louis Ave. ★ ★ St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD



Laminating time halved by WESTINGHOUSE DIELECTRIC HEATING

Two Westinghouse 10 KW dielectric heating generators cure laminating glue in minutes for Southern Desk Company in Hickory, N. C. Untrimmed chair seats and backs, held in Columbia presses, are turned out in half the time required with cold pressing. Advantage for Southern Desk: two-shift production in one shift.

Westinghouse dielectric heating equipment produced a better bond, too. Result: better product, fewer rejects. Cost cuts and quality boosts like this are available now for *your* operations.

All Westinghouse dielectric heating equipment is certified to meet FCC radiation requirements. For full information on this modern production equipment, call your Westinghouse representative, or write: Westinghouse Electric Corporation, Electronics Division, HF Heating Section, 2519 Wilkens Avenue, Baltimore 3, Maryland.

YOU CAN BE SURE...IF IT'S **Westinghouse**

J-02280

What's In It For Me?

The woodworking industry needs to do more than ask, "What's in it for me?" The old axiom about the world beating a path to the best mouse-trap manufacturer is not completely true. We have to make the world want the mouse-trap—want the products we make!

Each manufacturer must answer this difficult question: What do you have to offer that makes your product any more worth buying than that of John Doe? Is it cheaper? Better made? To be competitive—and this grows increasingly true—you must cut the price of your product by cutting your own costs and economizing on selling. Or you can raise the costs, make a product that outshines the rest and then really sell it.

Here are few facts emphasizing the potential market for wood products:

Nearly 2,000,000 new customers start to make purchases each year. Some of them are yours!

Population shifts account for still more people who are changing living habits and are additional new customers.

Henry W. Wales of Consider H. Willett says, "Well manufactured and designed furniture of today is currently the best consumer capital-investment buy and, the industry as a whole is entering the greatest competitive era for the consumer dollar that it has ever experienced."

Now, how can you help the customer want what you make? Advertising and salesmen—both of which we shall discuss in succeeding editorials —are part of the answer.

We like a story told about Mark Twain when an editor. A reader wrote asking whether finding a spider in his paper meant good or bad luck. Twain replied that it meant neither but that the spider was merely looking over the paper to see which merchant was not advertising so that he could spin his web across that door and live an undisturbed life.

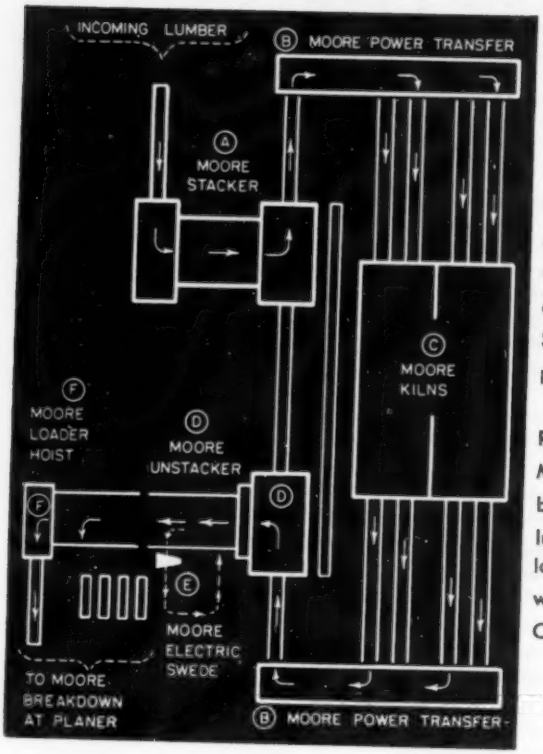
Consumer tests on brand names prove—as do other surveys—the value of constant, consistent advertising. Unfortunately the wood products industry is put to shame when we see the efforts made, and successfully, by the manufacturers of automobiles and appliances. Furniture trade associations, plywood associations, etc. are doing much to help.

Along with advertising is the need for good salesmen. Is your sales organization planned for the next several years, or is it a day-by-day proposition? Now is a good time to review: 1) selection of salesmen; 2) how you're teaching them to sell; 3) what you offer by way of incentives and compensation.

This editorial has attempted to provoke some thinking along the line of our original question: "What's in it for me?" There's a lot in this new competitive era for all of us, but we've got to make the better mouse-trap AND sell it!

E. McDaniel
Editor

Moore Stacker-Drying-Unstacker Systems-



The "Pay-Off" Combination

Study this typical lay-out — it may show where a Moore Stacker, Drying or Unstacker System can be utilized profitably in your plant.

Reduce your costs the Modern Moore Way, by power handling lumber by courses and loads, and seasoning with Moore Cross-Circulation Kilns.

Let us show how these cost-saving advantages can be utilized by you now. Write for Bulletin 5305.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

JACKSONVILLE FLORIDA · BRAMPTON, ONT. CANADA · VANCOUVER, B. C. CANADA · NORTH PORTLAND OREGON

Comments from THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

Under the leadership of the Hardwood Plywood Institute, of which Robert N. Hawes is the Washington representative, foreign competition is under an additional attack by the domestic industry. Applications for hearings have been filed with the Secretary of the Treasury under the Anti-Dumping Act of 1921. This Act is intended to protect the foreign industry as well as the domestic industry by equalizing the conditions of imports and exports. The hearing is held directly under the control of the Secretary of Treasury, George M. Humphrey, of Cleveland, Ohio.

Relatively few people know much about the Anti-Dumping Act of 1921. As a matter of fact, the Bureau of the Customs in the Treasury reports that its activities have been virtually dormant until very recently. It seems that aside from the hardwood plywood industry relatively few appeals for relief have been received. But it is expected, under present conditions, many other domestic industries will move against foreign imports by way of the Anti-Dumping Act. It is anticipated that the 70-80 complaints now before the U. S. Tariff Commission indicate what may happen in the Bureau of Customs in connection with the Anti-Dumping activities.

At this time the Secretary of the Treasury, through the Bureau of Customs, is engaged in investigating the complaints of the hardwood plywood industry, as well as some others; but there is not yet any definite indication as to when the hearings may be held. It is anticipated that these hearings will be more than usually interesting. In a sense, the Department of the Treasury acts as the champion for foreign industries. The hearings are bound to develop angles of interest we are not yet properly acquainted with; in all likelihood these hearings will

have a wider public interest that those which have been held by the U. S. Tariff Commission.

It should be kept in mind, however, that it is the tendency, of those who are in control of Treasury, as well as many other parts of Government, to prevent news of this kind from spreading widely. And in this effort they are abetted by a great number of those who are correspondents for the great newspapers of the country. Both Government people and news distributors are sincerely patriotic in their violent opposition to Communism and Socialism; but people usually fail to recall that the great majority are earnestly and vigorously internationalist. They believe in one world, and they believe in one world because they think it is the only way to foster universal peace. Most of them have never been beyond the purlieus of their own particular area and they have the misfortune not to understand the shocking difference in every phase of life between one great group of people and another. For instance, it is doubtful whether they even know the difference in the standards and the ideals of life prevailing in some of the European countries, much less those prevailing in Asia and Africa.

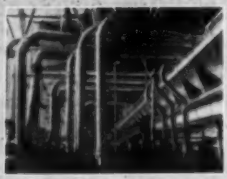
The President was expected to validate the Act for a general revision of the Tax Law sometime in July. The differences between the House and the Senate are minor but the business of adjusting these 3,000 differences takes time. The House and the Senate Committees in charge of the legislation spent most of the last three weeks of July ironing out their variances. Taxes will be cut another $1.4 billion and increase the aggregate tax relief this year $7.1 billion. The measure puts the chief emphasis on relief for business and industry. It is intended to help expand production and create jobs.

The people who are experts in taxes consider this the turning point in tax policy after 25 years. The system abandoned is what is left of the system that prevailed during the 'thirties and the 'forties—decades dominated by depression and by total war. The present problem is to adapt our tax system to the present needs. There were some revisions back in the 'thirties; but they were considered anti-business and anti-investment. One of the most important phases that have been under discussion during the years was the freedom of business to determine how fast it would charge off capital assets. At that time the whole system was restricted and the rate of charge-off reduced.

In 1936 dividends were made fully taxable under both the individual income and corporate profits tax. In the 'thirties much productive capacity was idle, and tax developments were rationalized by getting business swinging. When World War II came along we piled on top of this tax structure a set of rates dwarfing anything previously known in the United States. At the end of World War II there was a universal demand for tax reform.

But there was no grand postwar tax reduction and tax revision. Some of the tax cuts made in 1946 and 1948 had to be restored to finance the post-Korean defense build-up. Fortunately, the excess profits tax has now been wiped out, and

complete flexibility
outstanding efficiency



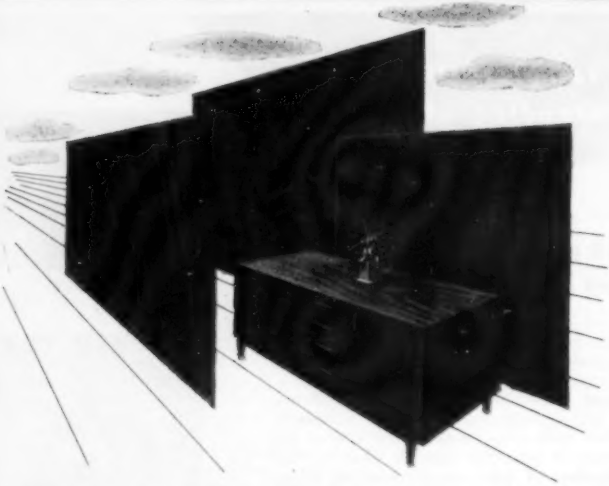
KIRK and BLUM
"Plenum Main" Dust Control

The many advantages in Kirk & Blum "Plenum Main" dust control are proven by a steadily mounting total of installations in leading woodworking plants.

The "Plenum Main" permits relocation of machinery at will without overloading or unbalancing the dust collection system. It allows the ready addition of extra fan capacity when needed or the reduction of fan capacity without affecting the balance of the system needed for operation. With all these advantages, the "Plenum Main" offers exceptional efficiency.

An old dust collecting system may be wasting substantial amounts of power, limiting production and handicapping operations in your plant. For a free survey of your dust control equipment and needs, write to: *The Kirk & Blum Mfg. Co., 3121 Forrer St., Cincinnati 9, Ohio.*

KIRK and BLUM
DUST CONTROL SYSTEMS



TAKE THE GUESSWORK OUT OF VENEER SPLICING

WITH UFORMITE JS-508

Your tapeless splicing department can be trouble-free, without complicated glue mixing, by using UFORMITE JS-508. UFORMITE JS-508 is a one-component adhesive, ready for application at the jointer or splicer after merely stirring in water.

Your edge-bonded veneers look infinitely better, and the joints are far more dependable. There's no formulation guesswork: UFORMITE JS-508 is pre-catalyzed and pre-lubricated. Long pot-life lets you prepare a day's batch at one time. Wide assembly time permits weekend storage of spread veneers. All these features add up to high production and a happy veneer-room foreman.

WRITE FOR MORE DETAILS. Get full details on UFORMITE JS-508, for conventional or high-frequency splicers, by filling in the coupon. No obligation, of course.

UFORMITE is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.

CHEMICALS FOR INDUSTRY

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THE RESINOUS PRODUCTS DIVISION

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the income tax treatment of married couples in all states has been made uniform by the income-splitting provision. Businesses have been allowed to carry operating losses forward for a period of five years.

The effort being made now is the first serious and hopeful attempt to completely reform the Federal tax system. It's known as the Federal Internal Tax Code of 1954. Of course it is limited. Tax revenue for Government uses must be kept very high. The corporate tax rate is kept at 52% despite the provision in earlier law that the rate should decline to 47% on April 1, 1954.

Some provisions of the law are particularly important for removing tax obstacles to all business. These, and other changes, total thousands of new details in the new tax code. Lawyers who specialize in taxes will be exceedingly busy. The tax law has always recognized that in calculating the net income of a business, a deduction from receipts must be made for the decline in the value of capital assets that results from the passage, wear and tear, obsolescence, etc. Present law and regulations strictly limit the rate at which these tax depreciation charges may be taken. The depreciation allowed in the early years of an asset's life is often much less than the actual or probable decline in its value.

This has a number of serious consequences. Businesses are reluctant to replace existing equipment with new equipment when the old still has a large value not yet written off. Also a risk is created, especially for smaller businesses, that the new equipment will lose its value as a source of income before all allowable depreciation has been taken. Moreover, under the old law, understatement of depreciation results in an overstatement of income and therefore of tax. In effect, the businesses are required to pay part of its taxes, earlier than they would have been due if depreciation were more reasonably calculated. This reduces funds available for business to invest.

Under the new law, according to the report issued by Senator Milliken, Chairman, Senate Committee on Finance, the basic provisions liberalize depreciation of allowances, primarily through the extension of the use of the declining-balance method at double the corresponding straight-line rate, applicable to new property acquired or constructed after December 31, 1953. Depreciation allowances computed under any one of the following methods are to be considered reasonable for new property acquired or constructed after December 31, 1953:

(1) The straight-line method allowable under present law.

(2) The declining-balance method, using a rate not in excess of twice the straight-line rate. Under this method a uniform percentage is applied to the unrecovered basis of the property. Since the basis of a particular property is constantly reduced by prior depreciation, the percentage is applied to a constantly declining balance. The depreciation allowances under this method, therefore, are considerably larger in the early years of the life of a property than those resulting from the straight-line method. The declining-balance method

depreciates 40% of the cost of an asset in the first quarter of its service life and 66 2/3% of the cost in the first half of its life.

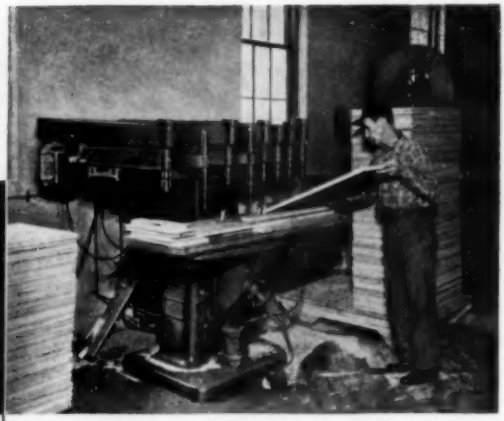
You may have seen a good deal of discussion about the President's re-insurance bill. Here are the facts. The bill provides an appropriation of $25 million. This is to be used to insure insurance companies that they will be certain to regain reimbursement of 75% of insurance that they write which is usually considered very risky. It covers life, accident, fire, destruction of property in various ways—in fact, almost any form of insurance the individual or the small business operator may require. The re-insurance is said to be prompted by the complaints of those who live in places and under circumstances that make it difficult to obtain insurance under usual circumstances. For instance, a small farmer is said to find it very difficult to obtain the same kind of insurance that is available to the person in the cities whose circumstances are about the same as the farmers. It is intended this insurance shall guarantee to the insurance companies, or organizations, any insurance written for people who normally have great difficulty in obtaining insurance. That, in effect, is re-insurance. It is opposed by a great many groups because it is deemed to be a further step in socialization or regimentation. It is pointed out that the average small farmer, or small operator, does not realize that it is another step to gradually wipe out a Constitutional United States. It is, however, unquestionably a very desirable achievement in the eyes of the average person of small means.

During the next few months the Department of Agriculture will purchase a large number of grain storage bins, primarily for the storage of Credit Commodity Corporation-owned grain, primarily corn. It will ask for offers on three types of structures: Standard bins of 3,250 bushel capacity; intermediate structures, either rectangular or round with a capacity ranging from 4,000 to 12,000 bushels; and flat-type structures approximately 40' x 100' with capacity of 40,000 bushels. The structures will be located chiefly in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin. Agricultural people say that the need for storage of Credit Commodity Corporation-owned corn will be very large in this area after July 31, when the 1953 corn price support loans mature. For detailed information write to U. S. Department of Agriculture, Room 403a, or Room 3901s, Department of Agriculture Building, Washington, D.C. The bins may be built of wood or steel.

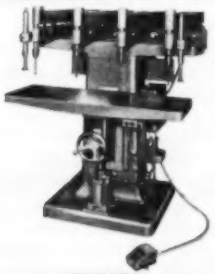
Lowest since 1946—154,160 forest fires were reported during 1953. The average for five years is 210,000. The report comes from the Forest Service, State Foresters, Department of Interior and TVA. It was found that during 1953 30,186 were deliberately set; 22,537 brush fires got out of hand; smokers caused 20,696; camp fires started 5,140; railroads were responsible for 2,619, Lumbering operations for 2,309.

ECCO

No.
448



REAR VIEW



FRONT VIEW

EKSTROM, CARLSON MULTIPLE-SPINDLE

BORER

The big advantages of this machine are: Versatility, Easy Adjustment, Rigidity, Accuracy, High Production Efficiency, and Automatic Table Feed Cycle. Standard machine has four spindles and two spring hold-downs, each positionable forward, backward, or sideways as desired on two T-slot rails. Individual belted motor drive on each spindle can be turned on or left idle independently as needed. Machine can be set up for single or series operations, as shown in picture above. Also available with more spindles, two-spindle cluster heads, larger tables, longer mounting rails. Spindles in sleeve-bearing cluster heads can be furnished with as close as 5/8" center-to-center distance, while 1-1/8" is the minimum using ball bearings. Write for quotation, or see your ECCo representative.

CONDENSED SPECIFICATIONS

Spindle Motor Horsepower	1
Spindle RPM	3600
Work Table Size	16" x 48"
Minimum Center Distance between Spindles	2-1/2"
Spindle Chuck Capacity	0" to 1/2"
Maximum Clearance between Table and Chuck	10"
Adjustment of Spindle Arms (Front to Back)	14-3/8"
Vertical Knee Adjustment	6"
Maximum Table Stroke	4"
Adjustable Table Dwell (Loading Position)	3/10 to 60 seconds

EKSTROM, CARLSON & COMPANY
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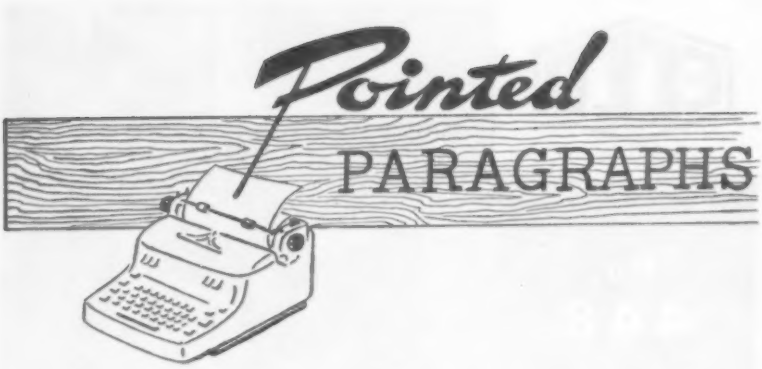

In our constant campaign to publicize best wood utilization we came across this interesting note in an advertisement for metal doors and ornaments We have checked with a horticulturist and find it true that metal trellises will burn plants. The ad we saw featured metal trellises and arbors!

The fourteenth inspection class sponsored by the National Hardwood Lumber Association begins in September. The quota of students has already been filled. Forty-six men graduated in the July class. These classes should have the complete support of our industry. Write to the association headquarters, 59 E. Van Buren St., Chicago, for information if you are interested in attending or sending someone for this training.

The American Tree Farm System, through which private woodlot owners are growing trees as a commercial crop has passed the 31,000,000-acre mark. Biggest gains are reported to come from the South.

Kiln drying clinics are being held with increasing frequency. This is very fine. We hope to help those engaged in kiln drying operations through our new department—"Kiln Drying Forum." See it in this issue.

August 4 has been set for the joint gathering, Statler Hotel, Washington, D.C., to press for a higher tariff on wood products from abroad, and also to use whatever influence the combined group may have to limit the quotas on import plywood and lumber.

Dodge Reports of contracts for future construction in the 37 states east of the Rockies again smashed records in June after breaking numerous other monthly records within the past year. Total of construction expenditures for the first half of the year has been record-breaking.

Word from the Western Pine Association says that production of lumber and lumber products in the western pine region has been about the same as last year. The report covers Idaho white pine, Ponderosa pine and sugar pine.

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DUO-FAST *Direct Drive* AIR TACKERS

12 Models
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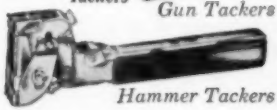
To Speed Your Job!

Users of these Direct Drive Air Tackers report remarkable production increases over former tacking methods. That is because these tackers are so fast, efficient, and easy to use. Women and non-skilled men workers can do a top quality job with Duo-Fast Air Tackers. Why not let air do your tacking work?

Also Available

A complete line of DUO-FAST Manually-operated Tackers

Gun Tackers



Hammer Tackers

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Have you seen some of the information circulated by the Wood Office Furniture Institute? These folks are doing a good job in selling wood for wood's sake. Here is a quote from a recent release: "Wood desks and chairs exert a powerfully and positively appealing personality in offices and other work places which by their very character tend to be cold and impersonal. Wood has a variety of rich association values. Wood furniture . . . brings a warmth which is due in part to the nature of the material itself.

The current research project underway at Austin, Tex., where 22 new homes are air conditioned is significant. The efficiency of kinds and thicknesses of insulating materials are being tested along with the heat-absorption qualities of different shades of interior and exterior paints. We shall have full details in a later issue.

A new door label has been issued by the National Woodwork Manufacturers Association for the use of its members and the industry. Pointers on the care and treatment of doors along with instructions for finishing doors are incorporated into this new label.

It is impossible at this writing to estimate what the strike has cost the lumber industry in the Northwest. The lumber walkout started June 21. About 60,000 of 100,000 lumbermen were involved.

New to us, and a good idea: a shake manufacturing company is selling colored nails along with their packaged products. They are available in 12 colors. This thoughtfulness is all part of the program to make the customer want what you make.

Final reports on the Chicago Summer Market say that cautious optimism prevailed. Orders were broad but lacked depth. Over-all business was regarded as average. However, many manufacturers are anticipating good follow-up business this fall. Prices remained firm. High sales and lower profits may be the furniture story for '54 according to some of the industry leaders.

Retail sales of TV sets are soaring to new records and consumer credit buying is picking up again.

Oregon State College forest experiment station has begun a study of some 18 related research projects. More projects will be undertaken in the future.

Color research done by a paint manufacturer recently shows that any toy—regardless of shape—will please a child if finished in flaming colors: red, yellow, green, blue, orange and pink. Colors to avoid are purple, black, brown, beige, gray, chartreuse, aqua, rose and other low-key colors.

Paper-covered veneer from white speck and honeycomb Douglas fir and logs of secondary species is now being produced by three Oregon companies. This product is used for box shook and in wrap-around containers. Future uses may include dust bottoms and case backs in furniture manufacture and liners for shipping.

BE INFORMED ON WOOD GLUING

Interested in glues and gluing? If so, your name should be on the mailing list of THE PERKINS GLUE LINE. This house organ of Perkins Glue Company is mailed free of cost or obligation to all who request it.

Recent issues of THE GLUE LINE have carried articles on a wide variety of subjects including: Glue Selection, Glue Handling & Storage, High Frequency, Moisture Content Detection, Moisture Control, Hardwood Plywood Imports and similar topics.

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"Our AMF De Walts are the handiest tools we've ever used!"

says Mr. E. F. Warner, Secretary and Works Manager, Trojan Boat Company, Kinzer, Pa.

De Walt with dado attachment performs the tongue and groove operation. Safety Power Feed runs at speeds up to 90 feet per minute.

"We process about 20,000 board feet of wood every week, while turning out an average of 60 motor boats and cabin cruisers.

"We've found our 3 De Walts work so fast they handle all the cross-cutting, mitering, beveling, bevel mitering, and straight and angle dadoing that we do. What's more, De Walt® makes each of these cuts easily, accurately and safely.

"There are no two ways about it. When it comes to building boats, our De Walts are the handiest tools in the business. We couldn't do without them."

You, too, will find amazingly versatile De Walt does just about every job — faster and better. Available in ½ hp to 10 hp models. Saw blades, 8" to 20". See your dealer or write us, c/o Dept. WD-54-8 for details.

De Walt Inc. AMF Lancaster, Pa.

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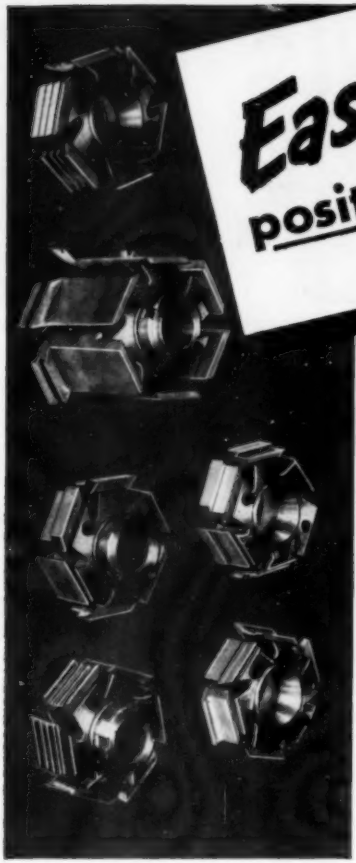

Easy set-up . . . positive alignment

• Diehl's complete line of standard cutter heads includes a wide variety of vice grip heads. Diehl vice grip heads are easy to set up, give positive alignment, and have greatest gripping power for retention of dovetail cutters. A few of them are illustrated, both with and without Diehl's self centering sleeve. Diehl vice grip heads are safer and more satisfactory for heavy cuts and high frequency spindle speeds. Diehl heads are rugged . . . they *stay* on the job!

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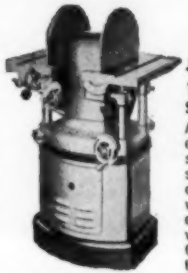
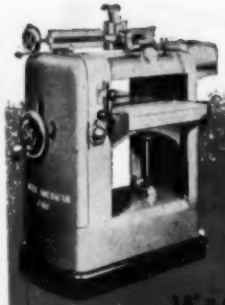
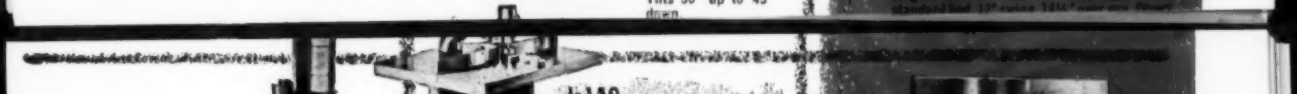


J-147
16" DISC SANDER
Available in single or double disc, or as single disc with belt sander. Vee-belt drive; ¾ HP motor with double disc machine, ½ HP motor with single disc. Counterbalanced table 8½ x 20¾". Tilts 30° up to 45° down.



J-166
18" x 6" SURFACER
Direct motor drive, 5 HP motor. Vee-belt variable feed, 18 to 55 F.P.M. Sectional top infeed roll and/or flexible chipbreaker optional. Three or four knife, round, safety cutterhead. Cast iron base and frame.

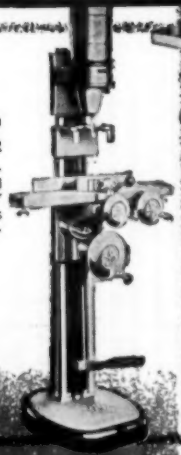
J-170
12' LATHE
Variable speed drive provides [illegible] R.P.M. Available for wood turning, metal spinning or both. Standard 35" bed; other bed lengths available. 31" between centers on standard bed. [illegible]



the J-Line woodworking machines with the traditional Yates-American quality.

with single disc. Counterbalanced table 8½ x 20¾". Tilts 30° up to 45° down.

P.P.M. Available for either forward, radial spindle or both. Standard 59" bed, other bed lengths available. 31" between centers on standard bed. 12" under table [illegible]

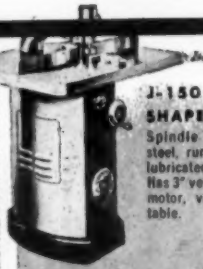


J-140
MORTISER

Direct motor drive. Foot-operated ram. Compound table . . . 30" x 6". Has 11¼" lateral movement, 4" cross adjustment, 18" vertical adjustment.

J-120
20" BAND-SAW

Wheels 20" diameter, 1" face. Wheel speed [illegible] R.P.M., blade travel [illegible] F.P.M. Table 28" x 28", tilts 45° right and 12° left. Takes stock up to 19½" wide, with opening under guide 13½". 1 HP motor, Vee-belt drive.



J-150
SHAPER

Spindle 1½" diameter, alloy steel, runs at 10,000 R.P.M. in lubricated-for-life ball bearings. Has 3" vertical adjustment. 2 HP motor, vee-belt drive. 30"x38" table.

J-145
SPINDLE SANDER

Oscillates with ½" stroke, 90 times per minute. Spindles available from ¼" to 3", detachable, coupled directly to ½ HP motor. Table 20" x 24", tilts 45° left and 10° right.

J-131 8" JOINTER

Three-knife round safety cylinder head, cutter at 7000 R.P.M., by Vee-belts from 1½ HP motor. Infeed [illegible] Bed [illegible] Fence 3" high, tilts 45°. Underslung guard.

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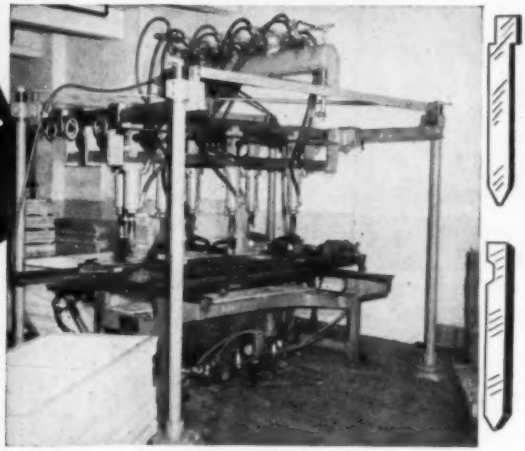
MODEL 800 MULTIPLE PNEUMATIC SASH PINNER



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HOW TO GRIND Woodworking Knives

By Robert Budke and Donald Derry

THE logical place for any moulder or shaper owner's contour knife-grinding facilities is within his own shop. Surprising as it may seem, there are countless small shops throughout the country without even the most elementary grinding equipment for re-sharpening their own knives! Even large plants must rely upon the skills of one or two men for all of their pattern grinding. Usually there is no one to take the place of the man in the knife room should he suddenly fall ill. One of the principal reasons for this sad state of affairs is the archaic procedure used in grinding knives and the lack of definite information in an understandable form. We have made careful studies of knife-grinding procedures in hundreds of mills throughout the country and believe the following method to be the easiest, fastest, and most accurate for any shop, whether the knife-grinding problem involves one shaper in a small shop, or all of the machinery in a complete furniture manufacturing plant.

The average woodworker, skilled as he may be at his particular job, considers the techniques and skills necessary for successful knife grinding far beyond his reach. This is not true. Anyone with enough mechanical ability to sharpen a chisel and draw a straight line can easily and quickly learn to grind knifes. There are no secrets. The basic rules for develcping patterns and grinding the steel are evolved by men in the woodworking industry. We have attempted to gather that knowledge and to explain each step from layout to finished knife, as one moulder man might tell another—and to write the whole procedure in good plain English.

Breaking Up The Cut

The general text of these instructions pertains to layout and knive-grinding procedures for moulders. The principles outlined also apply to shaper knives.

Before beginning the layout of a knife you must first determine how to break up the cut, or, in other words, which head to use to each part of the cut.

For best finish and easiest setup we recommend running patterns on the bottom head whenever possible. Several typical patterns and the method of breaking up the cut are illustrated in Fig. 1.

These drawings show the moulding in a running position of the moulder, as viewed from the infeed end of the machine. Always lay out knives showing infeed position. If you do this there will be no reversal of either knife or template to cause confusion in grinding

Mr. Budke and Mr. Derry are both with the Smithway Machine Co., Seattle, Wash.

or setting up. Always keep this in mind. This one simple rule will prevent the possibility of grinding a knife backwards, or of making it for the wrong head. Remember that you are always viewing the front side of the knife, and that the knives are always swinging toward you.

Cutting Angles

Once the cut to be taken by each cutterhead is determined, you can proceed with the actual layout of the knife. You cannot trace the exact contour of the moulding on a knife blank and expect to cut a true pattern. This would be possible only if the knife approached the work at exactly 90°. Needless to say, this is impossible because the knife would have no cutting action. In order to give the knife a cutting action, cutterheads are made so that the knife approaches the work at an angle. Our experience has taught us that cutting angles are relative to the specific gravity of the wood. Woods having high specific gravity, such as maple and birch, (very hard), work best with a minimum cutting angle of 7½° to 10°; while the extremely soft woods of low specific gravity, such as Ponderosa pine, work best with a cutting angle of 25° to 30°. The hard and curly-grained woods require a compressive-type cut while the soft-grained woods require a shearing-type cut. There is no best cutting angle—only a best compromise. Therefore on the XL mold-matcher we use a compromise cutting angle of 25° and find that this angle meets the general run of work. When we have to decrease this cutting angle we grind a face bevel on the knives, as shown in figure 2.

Extension of Swing

With an understanding of why knives are placed in a cutterhead at an angle, let us consider the effect this has on the layout of the knife. You can readily see that line A-B (actual depth of cut)

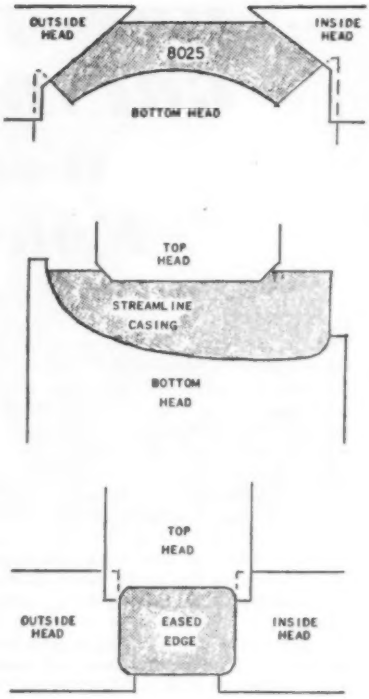

Figure 1.

is one leg of a triangle, and line A-C (actual length of the knife face) is the hypotenuse of the triangle. (Fig. 3.) In other words, the pattern ground into a knife must be deeper than the actual cut it is intended to take. For example let's suppose that we want to cut a ¾" (24/32") deep groove with a 25° cutterhead. The grooving knife would have to be 27/32" long. The knife, as you can easily see, is 3/32" longer than the actual depth you want to cut. We call this the "extension-of-swing." The extension-of-swing is different for each cutting angle.

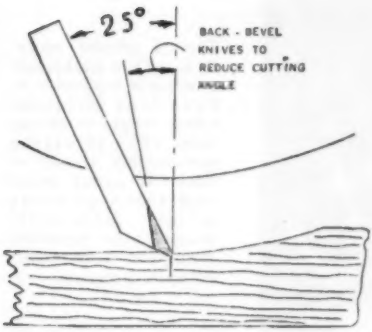

Figure 2.

The exact angle of the knife slots in a cutterhead can be determined by taking a "rubbing" of the head on a sheet of paper, then drawing a line through the center of the cutterhead to the tip of the straight knives. Measure the angle with a protractor. With the cutting angle of the knives known, the layout for extension-of-swing can be made. One very quick and very accurate method of getting the correct extension-of-swing, when a sample of stock is available, is to saw the stock sample at the angle the knives are mounted in the cutterhead (If knife slots are 25°, cut sample at 25°).

The pattern on the edge of the sample will be the exact pattern for the knife. Trace this shape directly on the template, and grind the knife to the template.

Development of the Knife Template

Let us now consider the problem of laying out a knife pattern from a sketch so that the finished knife will include the "extension-of-swing." You will be surprised how easy this is to do. First trace an outline of the actual moulding on graph paper with ⅛" squares (any paper will do if graph paper is not available). Remember to lay out the moulding shape exactly as it would appear from the infeed end of the machine. Be sure that dimensions are exact.

The layout of a knife template is not difficult, but it is time-consuming and demands very careful measurements to assure accuracy. Besides, most shops have no thin-gauge metal available for making templates. Because of these inconveniences, most knife men in the past usually started out to make a knife in a hit-or-miss manner, attempting to sight the pattern while holding the knife at what they judged to be the correct angle. With practice, some did become

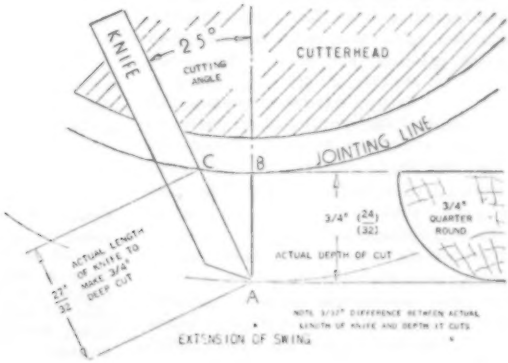

Figure 3.

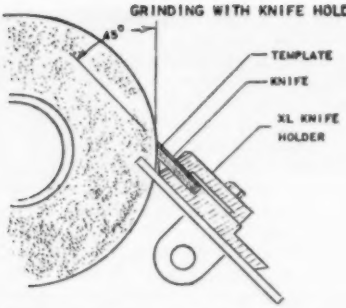

Figure 7. Note that each knife is shown clamped into the XL knife holder, with the template placed on top of the knife. Keep the knife and template in the knife holder until completely finished.

cut, (Point D). This completes the layout for the bottom head knife template.

The side head template will be very easy. Just remember the sequence in which the heads cut—top head first, then side heads, and bottom head last. Remembering the sequence, you will realize that the bottom of the stock is rough when the side heads cut. Therefore the side head knife must extend beyond the lower surface of the stock. Your layout always begins on the jointing line (the line 1¼" from the bottom edge of the template). Locate Point A on the jointing line, Point F four spaces over and five spaces up. (Remember to allow ⅛" knife beyond Point F). Scribe a straight line through Points A-F, and this template is finished.

In breaking up the cut for this setup we decided to leave the straight (jointing) knives in the cutterheads, using the opposite slots for the bevel-knives. The straight knives will cut the edges of the stock to a finished width so that side guides can be set. The straight section of bevel-knives is not intended to cut. We suggest that the knife be made like this in order to get more knife width so that it will have sufficient bearing in the cutterhead. Attempt to clamp a knife less than 1" wide in a cutterhead is dangerous business.

Study the typical pattern illustrated, and you will see how simple it is to transfer any pattern from graph paper to the template. When transferring points on a curved surface we suggest that the points be placed closer together so that the contour is better-defined.

Your template is now correctly laid out. Use the grinder cutoff wheel to cut it to length and to grind the contour.

Choosing the Proper Knife Steel

You are now ready to begin the actual grinding of the knives. A discussion of grinders and grinding wheels will be made in later paragraphs. We will limit our present discussion to the actual grinding procedure.

Use this rule to determine the width of the bar from which to cut your knife. The knives used for straight cutting are 1¼" wide. For a pattern ¾" deep use 1½" steel; ½" deep, use 1¾" steel; etc. For intermediate cuts use the closest bar size.

The XL knife grinding system makes use of two essential tools: XL template stock and the XL knife holder. We have shown you how XL template stock aids in developing the knife pattern. Now we will illustrate the use of the template and knife holder in actually grinding the knife.

Examine the knife holder. It has many advantages over former grinding methods. Following are some of the advantages you will gain, by using the XL knife holder.

Knife Holder

1. Grinding time is reduced as much as 50%. This is possible because the heavy body of the knife holder tends to dissipate heat much better. When holding a knife in your fingers, you frequently quench it in water because it is burn-

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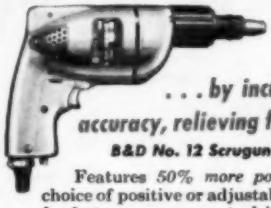

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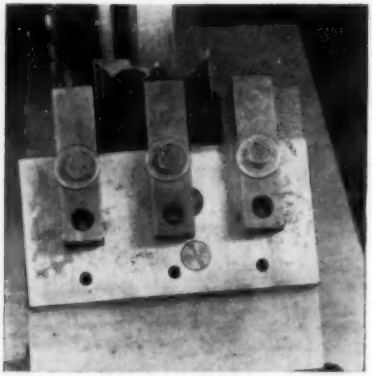


Roughing-in knife with cutoff wheel. Template is clamped on top of knife and excess steel ground away with cutoff wheel. Allow 1/32" to 1/16" steel beyond template for finishing.

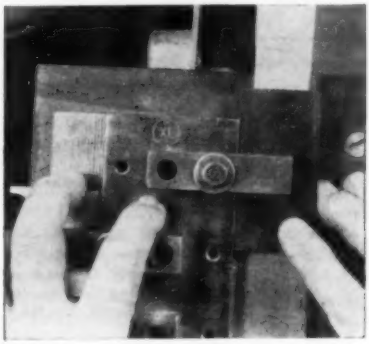
ing your fingers, not because the heat might draw the hardness out of the knife. Less frequent quenchings are required with the XL knife holder. The template is clamped directly on top of the knife, thus completely eliminating lost motion in checking the knife to a sample or a loose pattern. With the XL knife holder you simply keep grinding until the knife is finished.

2. Every knife is ground true with the corrugations. Many times off-hand grinding will produce a perfect pattern, but the pattern is not parallel with the corrugations. Consequently the moulding it makes is crooked and off-standard. Knives are clamped into the knife holder exactly the same as they are clamped into the head making it impossible to grind a pattern off-parallel with the corrugations.

3. Exact duplication is possible. You most likely have heard statements that anybody can make one knife, or one bolt, or one chair; but to make another one just like it is quite a problem. It's a problem for the off-hand knife grinder too. But it isn't a problem with the XL knife holder.

4. The use of the XL knife grinding system is a guarantee that your patterns will remain the same. Not only are the knife template and knife holder used for originally grinding the knife, but they are used for all regrinding work. You are absolutely sure that your moulding pattern will remain unchanged throughout the entire life of the knife.

The XL knife holder has two shelves-one corrugated and one smooth. Since the XL moldmaster uses corrugated knives, let's grind a pair from this material, clamping the knives on the corrugated shelf. You have already made your template layout perfectly square with the corrugated knife slots in the cutterhead, so be sure that the back-



Using knife holder to grind shaper knife.

edge of the template is tight against the ledge of the knife holder. In making a knife you will be grinding with true reference to a corrugation, and with subsequent regrinding you will always be indexing to a corrugation. Your knives will always be mated. This is important for balancing, but you must remember, no matter how closely mated knives may appear, they must be bal-

1500 pieces per hour

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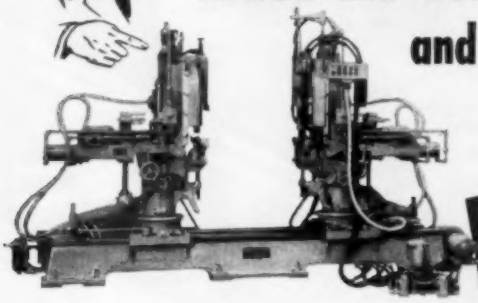

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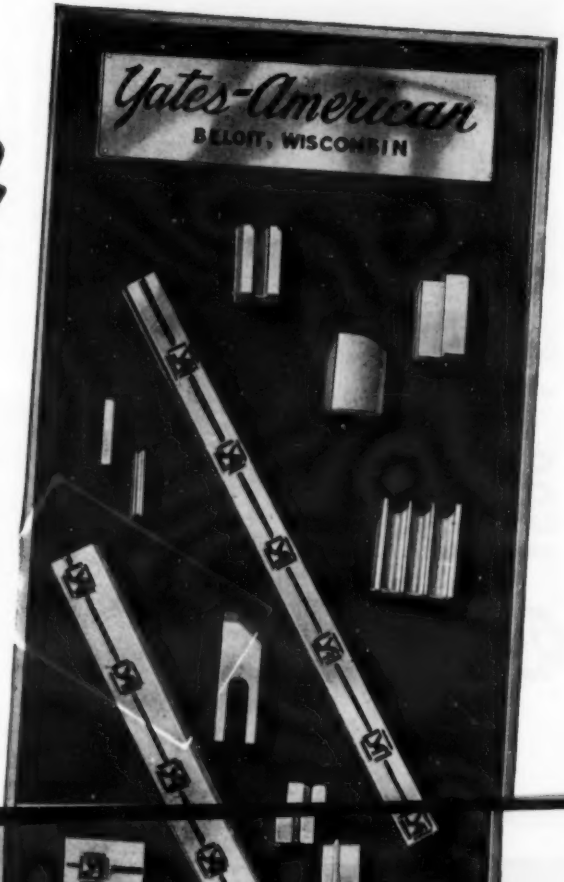

heat treating; uniform hardness; precision surface grinding; accurate edge grinding and beveling; individual inspection and testing; precise cut-off and balancing.

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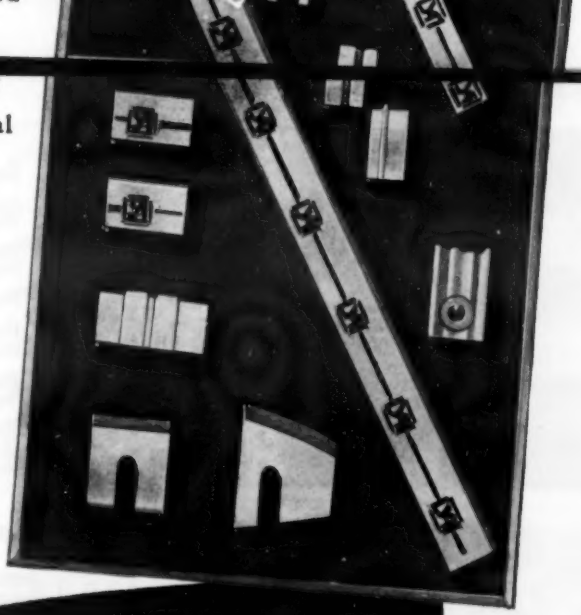

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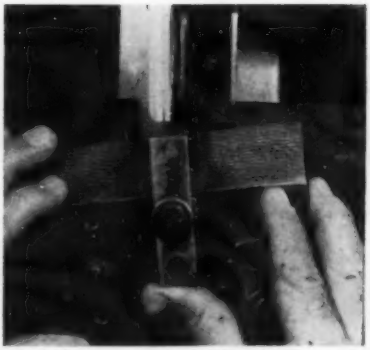
anced on a sensitive scale before they are mounted in the cutterhead.

Grinding Knifes

After making the template and selecting the proper steel bar stock from which to grind the knives, the next step is to cut knife blanks off the bar. Cutting the knife to length is simply a matter of clamping the template on top of the knife, as shown, so that the knife projects beyond the end of the holder. Then push the knife through the cut with a steady motion. Be sure that your knives are the same length because this will minimize balancing work later. When placing the knife blank and template in the holder, be sure that the back edge of the template is against the shelf on the holder. Clamp them into position and rough-out excess metal with your cutoff wheel. (When regrinding a knife you set the knife out one corrugation, making sure that the back edge of the template still touches the shelf).



Tilt holder to produce side clearance on radius cutter.

Use GW-121, ⅛" cutoff wheel for roughing-in. Exert all the pressure you want to cut and grind away excess steel, but be careful not to overheat. This wheel will rapidly cut away excess stock. Stay about 1/16" away from the template on rough-in cuts. Remove

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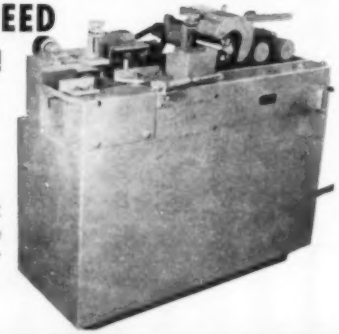

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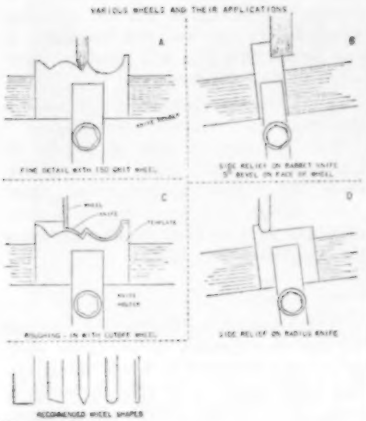
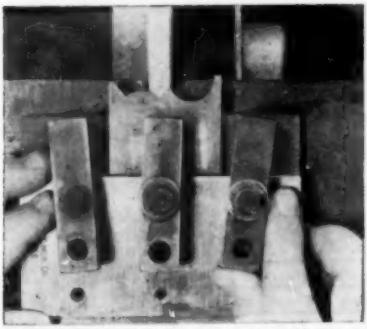


Figure 8.

any burr that may have developed, and proceed with the finishing.

Finish a knife completely before removing it from the holder. You may be reluctant to finish the knife with the template on top for fear of damaging your template, but if you exercise a little care you can grind to the template, yet never touch it. As you grind, you will notice that a little burr rolls up.



Using fine-grit wheel, dressed in V-shape to grind sharp corners in moulding knife. Note that the knife is held at 90° to the wheel. It is not necessary to tilt the knife for clearance.

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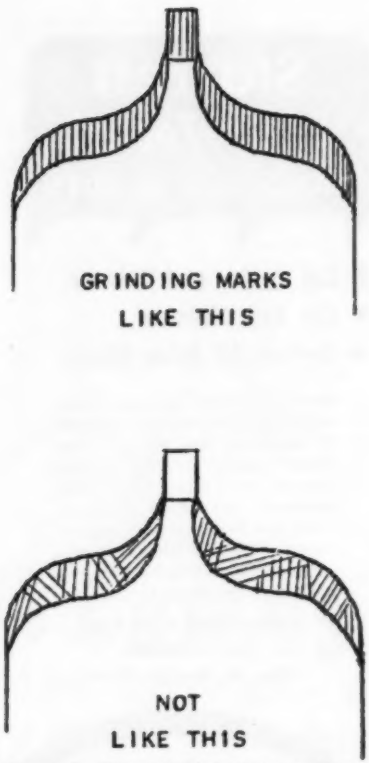

Figure 9. Always hold the knife perfectly parallel with the wheel. Grinding marks should never criss-cross.

This burr disappears the instant it touches the template, yet the grinding wheel hasn't touched the template. If you watch this you will quickly learn when to stop grinding.

Touch up the finished knife with a slip stone to remove the wire edge.

The last step in making a pair of knives is to balance them on a sensitive scale. After this the knives are then ready to run and you have the assurance that they will cut the exact pattern you started out to make.

Bevel Angles

For clearance on the back of knives we can reccommend no set rules, such as a ratio of bevel to knife thickness. The knife needs only enough bevel to clear the cutting circle. Insufficient bevel will cause the heel of the knife to drag. Too much bevel makes the edge too sharp and the knife dulls quickly.

We find that a 45° bevel works very well for moldmatcher knives and puts more "guts" at the cutting edge to resist the shock of cutting knots and hardwood. The thin razor-like edge caused by a knife bevel of 30° simply gives no service at all. You must remember that the cutting and shearing action is slightly compressive and thickness at the cutting edge is needed to stand up in service.

When grinding knives which are to be jointed we suggest the 30° bevel. In

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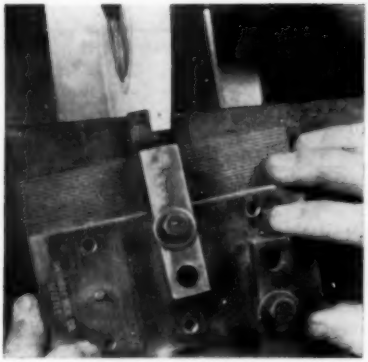

Tilt cutter to produce clearance on knife. This is a fine grit wheel which has had the side undercut approximately 10° so that it will grind sharp inside corners and produce desired clearance.

this instance the sharp edge produced by a 30° bevel is desirable because the knives will joint-in easier. Jointing brings the knife back to the same result as the 45° bevel since it restores some knife thickness at the cutting edge. However when knives are not to be jointed we recommend a 45° bevel.

Selection of a Grinder

The proper selection of a grinder is important if you wish to produce good work at reasonable speed. The grinder must have sufficient power. It must have rigid shaft construction to resist deflection and side thrust. It should have a totally enclosed motor. Heavy wheel guards should be provided for maximum safety. The grinder should also have large tool rests, or grinding tables, so that the knife holder can be easily manipulated against the wheel and grinding angles maintained perfectly. It must also have a water container large enough to accommodate a 6"-long knife.

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3/8	1/2		
1/2	43/64		
5/8	53/64		
3/4	63/64		
7/8	1 1/8		
1 1	1-9/32	1-7/64 *	1-1/64 *

* Use equal extension-of-swing for each 1/8" increment.

specifications. To our knowledge, it is the only grinder made expressly for hand-grinding woodworking knives.

Grinding Wheels

We will not attempt to explain the technical reasons for choosing the grinding wheels recommended, nor the meanings of the symbols shown on grinding wheels. We reason that you are not especially interested in the way a grinding wheel is made nor the theory behind it, but you are interested in obtaining grinding wheels which will do the best job, stand up the best, at reasonable cost. The primary consideration in choosing a grinding wheel is its ability to cut rapidly and cleanly. The following wheels were chosen because they are the best available for grinding high speed steel woodworking knives:

GW-121—1/8 x 12 cutoff wheel.

Used for cutting steel to length and for roughing-in patterns. We suggest that you keep a few of these wheels

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GW-122—¼ x 12 grinding wheel
General-purpose wheel for finishing the knife. This wheel can be dressed for cutting small radii or bevels. (See Fig. 3, 8-C.)

GW-123—⅜ x 12 grinding wheel
General-purpose wheel. Used for finishing the knife; can be dressed for large radii or bevels. (See Fig. 3, 8-B.)

GW-123-F—⅜ x 12 fine finishing wheel
Very-fine-grit wheel which can be dressed for intricate corners, bevels, or radii. This is strictly a fine-detail wheel, not recommended for general grinding, but very essential for fine detail. (Fig. 3, 8-A.)

GW-124—½ x 12 grinding wheel
General-purpose wheel for grinding straight surfaces (straight knives, etc.).

GW-126—¾ x 12 grinding wheel
General-purpose wheel for grinding long, straight surfaces.

D-10—dressing stick
Used for dressing wheel, forming bevels, and for keeping wheels true.

S-10—slipstone
For honing knife after grinding and for touching up knives in machine between grindings.

Helpful Suggestions

1. Dress wheels frequently enough to prevent them from wearing out-of-round.
2. Use a D-10 dressing stick or a diamond dresser to dress the wheel.
3. Examine wheels for hairline cracks or breaks before mounting them on the grinder.
4. Never run a wheel faster than recommended.
5. Always dress a new wheel before attempting to grind with it.

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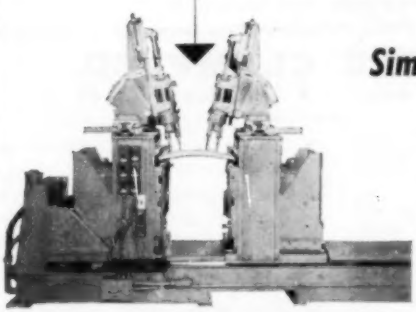

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6. Use a steady pressure, but don't try to force a wheel to cut faster. To force it will cause glazing.
7. Have a wheel for every shape and change wheels as you need them. Some operators use two or more grinders and move to the wheel shape needed.
8. Do not change wheel profiles because this uses up the wheel too rapidly. Replacement costs are then evident.
9. Always hold the knife perfectly parallel with the wheel.
10. It is not necessary to angle the knife holder to the rim of the wheel, except for clearance on outside corner radii and for side clearance on rabbet cutters.
11. Keep your knife templates. Use them as the standard for maintaining exact moulding patterns.
12. Use XL knife steel for best results.

Trademarks and Patents

This is a reader service which we hope will continue to be helpful in avoiding infringement of trademarks and patents of others in the industry. The material has been compiled for us by James M. Heilman, director of the Legal and Patent Department, U. S. Plywood Corporation.

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"Shoestring" Begins SHAKES Enterprise

By Bert Goldrath

DEPENDENT only on nature to supply the raw materials, the Reaves Roofing Company of Palo Alto, California, operates as self-contained a mill as can be found anywhere for the production of redwood roofing shakes. Practically every piece of power equipment on the premises has been shop-made under the guidance of Manager Jay Adams.

Launched 20 years ago on a shoestring by Mr. and Mrs. Robert Reaves, the company now does an annual business in excess of $800,000, about half of which is in redwood shakes. Cedar shakes and shingles are also turned out at two Oregon mills owned by the firm. The big trees from which are cut the growing volume of redwood shakes are located in a tract in the Santa Cruz mountains. Part of the tract, incidentally, has recently been leased to an oil company which will soon begin drilling operations.

But the real story about Reaves concerns its homemade but highly ingenious equ pment.

Let's start with a 24" double cutoff saw, into which pieces are fed to trim

Behind this unassuming facade of California architecture buzzes a mill which helps fill a worldwide demand for redwood roofing shakes, like those tiered on pallets in the yard (right background).

A table made of welded angle iron and fitted with a friction clutch feeds chunks of rough-cut redwood into a pair of circular blades which trims the pieces to 24" lengths and squares up the ends. The roller conveyor in right foreground carries the pieces to the next operation.

them to 2' lengths. The lumber is held on a rotating table equipped with a friction clutch to protect the motor against damage. In addition to trimming, the saw squares up the ends. A power conveyor then moves the pieces up to another sawing operation. Here, the pieces are hand-fed into a huge vertical circular saw which gives them the proper longitudinal taper, so that they first become recognizable as roofing shakes. As the operator grabs the split pieces with his left hand, he transfers them to his right and trims them to a width of about 9".

Bulky pieces that won't fit into the jig during this sawing operation are hand-fed into a heavy-duty band saw to give them the correct taper. This is an extremely hazardous job, and alarmed safety engineers have studied it carefully without finding a better way. It might be said that the remarkable thing about Harvey ("Red") Hankins, who comes close to being a one-man sawmill, is that he still has all ten fingers.

All the equipment described here is not only shop-made—it is shop-maintained. Hankins has rigged up a jig to hold the 14" diameter band saw blades while they are run through a sharpener. He usually keeps a circular saw sharpener going nearby at the same time.

When the shingles are cut and trimmed, they are tossed into a bin

From the conveyor, the pieces are run through blade at right to get the proper taper, then trimmed again lengthwise to a width of about 9". Working high-speed saws, one with either hand, operator must be skillful.

Pieces which can't be accommodated on the circular saw are tapered on a heavy-duty band saw. Here again, skill and care are extremely important. This operation is done by eye, without the use of a jig.

which opens at the bottom. Here, a man stacks the shingles or shakes into bundles. As many as 50 bundles a day can be turned out when four men are working the mill.

In connection with the shake production, ridge pieces are also needed. These are cut four at a time and beveled on a revamped tile saw and stapled together in pairs on a stapler next to the saw.

It would be nice, but not quite true, to say that all this whirlwind activity takes place in a clean, modern blower-equipped shop. However, the mill is set up in an open shed, largely built from scrap materials. The yard around the shop is not yet hard-surfaced because, as Adams says, "We're too busy on production to take time out for housekeeping."

One project that kept the Reaves crew busy was the designing and building of a combing machine to achieve a striated effect on roofing shakes for more pleasing shadow lines. The redwood shakes, after cutting and trimming, are fed through the comber on a foot-wide rubber belt, which is built up with wood strips to hold the tapered pieces at a uniform height while being run through.

A large waste box in the yard is another project, through which the company has saved thousands of dollars a year. Formerly, a truck was used as a waste receptacle, and driven to a dump when full. Now, when the waste box is full, a winch hoists it through a system of pulleys high enough so that a truck can back in under it. The contents are dumped into the truck, which gets rid of its load and is released for active duty.

Thick butt redwood shakes, which only recently have won the approval of leading architects, are shipped by Reaves all over the world. (Redwoods thrive only in a narrow strip along

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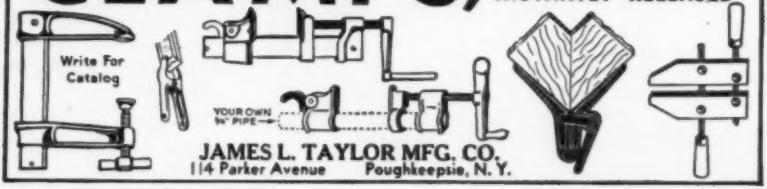

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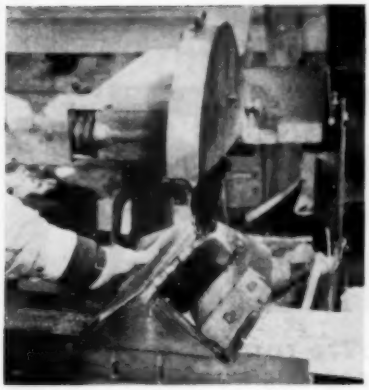

Ridge pieces are properly beveled on this converted tile-cutting machine before being stapled together.

the California coastline.) Hollywood architects in particular, Adams reports, are using redwood to roof new houses being built in the movie colony. "The fact is," he says, "we can't keep up with the demand."

As a step in the right direction, the company has palletized its stacking operations in the yard. Redwood, being practically indestructible, need not be kept under cover. Three fork lift trucks were purchased and have been redesigned to fit the particular needs of the Reaves crew of 40 men. One, fitted with a frame at the top to hold the load more securely, rises to a height of 24' and can shift from side to side.

The inventory of rolling stock also includes three army half-tracks, which are used in the timber tract. Power counts in moving the big trees, and equipment is all on a Herculean scale. It has to be: one tree felled recently was 11' in diameter and 225' high.

Supervisor of many of these gigantic he-man operations is Mrs. Robert Reaves, a diminutive woman weighing less than a hundred pounds!

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Evolution of LUMBER DRYING TECHNIQUES and DRY KILNS

Part 9

By Paul H. Graham

ALTHOUGH various modifications are used, the three basic steam coil pipe systems are the plain header coil, the multiple return-bend header coil, and the single return-bend header coil. The location of the coils is dependent mainly upon the design of the kiln, particularly in reference to the circulation system, and size and shape of the building. The usual locations are either below or above the lumber, although some kilns place them along the sides of the kiln or between the loads. Booster coils used in double track kilns are always located between the loads.

Special ceiling coils are sometimes installed in kilns where the major heating coils are located under the lumber. These usually consist of a few runs of 1" pipe suspended a few inches from the ceiling and spaced from 1' to 3' apart. They are installed to heat the ceiling independently to prevent condensation from forming to drip on lumber and interfere with humidity control and to replace heat lost through the ceiling. Ceiling coils are generally not required with well insulated ceilings or in kilns where heating coils and fans operate above the lumber load.

When used along the walls, pipe coil radiators are usually installed to provide more headroom to hake it easier to get rid of water condensation and to permit the use of return-bend coils in long kilns with the pitch required for proper drainage. Wall coils are also used as condensers.

In kilns designed for steam humidification, spray lines are used which usually extend full-length of natural circulation and internal fan kilns or may be located near heating units in external blower kilns. In the natural circulation kiln the steam spray line is located below the rails usually to keep the spray from spraying directly on the steam coils. In fan kilns their location is near the fan to mix the spray with the air thoroughly before passing through the lumber load. These steam spray lines are generally made with 1" to 2" plain pipe, drilled with ⅜" or ¼" diameter holes spaced from 2' to 3' apart.

The development of modern steam coil systems really began with the introduction of thermostatic systems of control to supply heat to the kiln, in which thermostats, by intermittently opening and closing the steam valve, controlled the amount of steam entering the steam coils. In the original plain header coil system when these automatic controls for controlling temperature and humidity were installed, it was almost impossible to control the kiln temperature beyond the point where the thermostatic control was at-

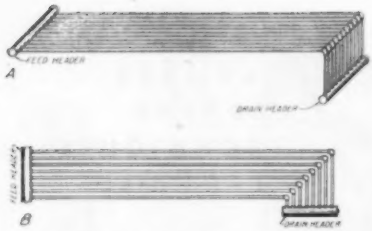

Fig. 1. Plain header coils. A, horizontal coil; B, vertical coil.

tached to the system.

All steam pipes were grouped under one large valve and as fast as temperature at the thermostatic end reached the preset temperature, the supply valve was cut off. As a result, the system never received sufficient steam at the drain end of the coils and a non-uniform temperature was produced throughout the length of the kiln. While air-dried lumber could be dried reasonably well, it was practically impossible to do a satisfactory drying job with green lumber.

To obtain uniform drying with green lumber, it became necessary to remove the upper layer of pipes and construct another coil which was laid on top of the existing lower layer of the original coil, but under a separate valve which was used alone for lower temperatures when first starting a run to dry this green lumber. The lower coil was only cut in when the moisture content of the lumber had been brought down below 20% to increase the heat to conform to demands of the drying schedule.

The success of this arrangement led to further modification in which the heater coils were spilt into a number of separate banks, each equipped with individually operated valves. This became known as the vertical multiple-unit header system. While its use did result in a more even heat distribution throughout the length of the kiln, it produced uneven heat distribution crosswise of the kiln. Its use also had the effect of making the automatic controls only semi-automatic as cutting off or turning on of the separate heating coil units required manual handling.

A better harmony with automatic control operation was obtained when this system was modified into a multiple-unit header system with return-bend coils. In the new system separate heating units were connected to a single main supply line, to which automatic control was attached so that steam could be distributed evenly crosswise as well as lengthwise of the kiln to provide a uniform heat distribution.

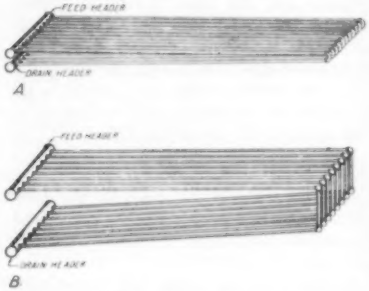

Fig. 2. Vertical multiple - return - bend header coil.

Steam coils of steel and galvanized pipe used in early kilns had a tendency to fail from corrosion under the moist acid conditions of the kiln and required frequent replacement. Wrought iron pipe was later introduced to meet more severe drying schedules and produced such good results that it is still a favorite steam coil pipe. Cast iron headers have given good service since first used and cast iron fittings are standard equipment. The use of fin pipe and pipe of non-ferrous metals is becoming quite common in the new dry kilns and copper is even being used in condensate lines.

Fig. 3. Horizontal return-bend header coils. A, horizontal return-bend header coil using return-bend elbows; B, using 90° elbows and connecting nipples.

Claiming about a 10-to-1 greater radiation in equal pipe diameter for copper, its exponents report its use greatly improves kiln radiation and reduces the amount of pipe required. It is known that fin pipe delivers more heat than plain pipe and it has become standard equipment for many of the modern kilns. Its construction consists of an inner pipe of ferrous or non-ferrous metal and fins attached in spirals of the same or compatible metal, anchored with a protective coat of solder, or tinned or pressed into the pipe. The spiral fins have varied spacing, up to six and one-half to the inch; are arranged parallel to the air flow; and provide good contact with the air while the inner pipe assures uniform steam distribution.

The various advantages claimed for fin pipe include: from four to ten times better radiation in equal pipe diameter, greater transfer of heat, less resistance to air flow, lower steam consumption, equally efficient for low pressure exhaust steam or high pressure live steam, lighter weight, easier control for uniform heating, less space required for piping and less piping needed, and lower installation cost.

Plain pipe, on the other hand, has a lower first cost; performs satisfactorily for all but the most severe drying schedules; has very good flexibility and adaptability for a wide range of shapes and sizes; and can be easily repaired by the average shop mechanic.

Final choice between these two pipe types is generally an economic consideration in most dry kiln installations based upon cost, space and performance requirements. Whatever type of pipe is used, it must be of required size and shape to properly heat the air of the kiln and connected in such a manner as to permit expansion and contraction in service in the heating coil. There must be provision made for adequate adjustment in the amount of heating surface used by cutting pipe-coil sections in or out as required, as well as for efficient means of venting air and removing water of condensation from the entire system.

Fig. 4. Horizontal plain header coil with steam fed at one end of header showing how air and condensate may form in pockets causing short circuiting. Arrow shows steam flow.

In the plain header coil heating system of a double-track dry kiln one complete coil is placed below and between each set of tracks under the lumber load. These pipe coils are graded with a downward pitch of about ¼" per foot of length from the feed to the drain header. The supply headers and their pipe connections are fitted with right hand threads. The drain headers and springer (expansion) pipes are fitted with both right and left hand threads. Long pipe run components of each coil are made of 1" pipe secured to the supply header at one end and smaller springer (expansion) pipes at the other which in turn are attached to the drain header. Although the drain header in this installation is located at the opposite end of the kiln, other kilns using vertical header coils may have both headers installed at one end of the kiln

Fig. 5. Wall coil of the "Z" type.

with a short run of pipe at the other end.

In these long coils the number of runs or pipes to the header are held to the minimum required for adequate radiation and are designed as well as possible to prevent short circuits. The pipe fittings are kept to a minimum consistent with good performance and roughness inside all joints is removed to allow free flow of steam and drainage of condensate. Pipe racks or supports are placed every six or eight feet to keep the pipes in proper position and sufficiently far apart to permit free circulation of air between them. This spacing and the staggered position of openings leading out from headers permits any pipe being taken out and replaced without disturbing others. All exterior piping such as headers, feed lines, etc. is covered to provide protection against unnecessary condensation and waste of steam.

When operated with a thermostat, this plain header coil heating system is less efficient than the return bend coil systems where it is desirable to have uniform temperatures throughout the kiln. Uneven heating takes place each time the thermostat opens because when the steam is turned on, the end of the kiln closest to the supply header always heats up first while the other end does not heat up until all the air has been exhausted from the coil. The headers also provide a larger heating surface to produce hot spots in their area and uneven distribution of heat. Also when low temperatures are used and heating surface is excessive, the theromstat is operating most of the time.

In the return-bend coil heating systems the top pipes of each group always get hot first throughout their entire length, as steam must pass through them before reaching the lower pipes. With the supply and return on the same end and the pipe coils sloping down and coming back, the hottest part of the coil on top is offset by the coolest part of the coil on the bottom to provide a more even distribution of heat. Their design also prevents air and water from being drawn into the coils by a water seal formed by condensate that drains to the lower section of the coil in and near the drain header. They do, however, require more labor and more materials in the form of traps, fittings and pipe.

In most return-bend coil heating system designs, the multiple return type is usually vertical and the single return type horizontal. When runs must traverse the full length of the kiln, a condition more common to earlier kilns of this design, sufficient headroom for vertical arrangement of pipes must accommodate not only the pipes and return bends but also the required downward pitch (minimum 0.1" per foot) from supply to drain end of each group. This pitch forms a V with pipe groups connected end to end by top pipes by return bends to the bottom pipes and the longer the kiln the greater is the headroom required for the pipes.

In blower-type kilns, however, the vertical header coil is smaller and is usually placed in the supply and return-air ducts. Modern kiln practice and design take into consideration the fact that coils should be kept as short and as small in number of runs as possible, since experience has shown that the coil will have less tendency to water-log and air-bind when resistance to steam flow within the coil is reduced to a minimum. Accepted practice now holds most steam coil lengths to a maximum of 50 feet. It also favors flexible control afforded by the use of several small coils, each equipped with hand-operated valves.

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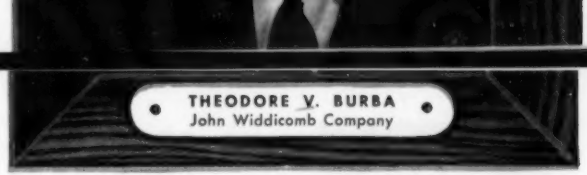

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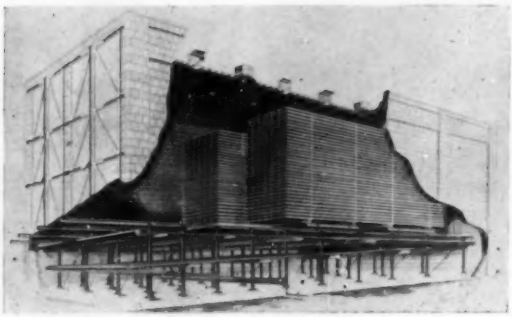

Courtesy Moore Dry Kiln Co., Jacksonville, Fla.

Graduated return bending heating system of early Moore dry kiln developed and patented during the early 1900's.

In many of the longer kilns independent heating coils are installed at each end of the kiln, equipped with an independent control system to provide independent temperature control at each end of the kiln. A seperate control usually provides humidity control for the kiln. In a typical installation the steam supply headers are installed at opposite ends of the kiln. Supply from the main is brought to the center of the kiln where it branches out to each end, permitting steam to enter supply headers at each end at the same time and in equal volume to flow through the coils in opposite directions. It is claimed that this counter flow balances the heat to provide uniform temperature throughout the length of the kiln.

It should be explained that there is danger in using coils of unequal length from the same feed line. The shorter coil tends to have greater efficiency, in that it presents less resistance to the steam flow, so that steam may short-circuit the shorter coil and since it flows with more resistance through the longer coil, may water-log the longer coil to produce variations in temperature and non-uniform heating.

Another modern kiln installation features a multiple, semi-vertical, return-bend coil system especially arranged to work in harmony with the automatic control devices. The separate units are connected to one main supply, to which the automatic temperature control is attached, and steam is distributed evenly throughout the kiln. Header and feeder lines are insulated and steam heating coils are headed and drain at the center of the kiln, two banks on either side. In this kiln each bank is made up of about 15 runs of 1" plain wrought iron pipe extending from the center to each end of the kiln.

A kiln heating system made up of 1" multiple-fin pipe is broken up into four banks of pipe on each side of the kiln chamber, which are zone controlled for uniform temperature, in double return-bend formation. The air flow chamber is completely covered by the small-diameter heating pipe and is said to provide uniform air temperature and maximum heat transfer and to prevent air-binding and water-logging. Condensate from heating coils is trapped back into a condensate tank at the side of the kiln from where it is pumped back to a make-up tank in the boiler room.

During this trip for inspection of various kiln installation coil systems an operator of one of the early plain header coil system kilns said that where his heating system was held under one valve and the system was adequate to obtain temperatures up to 170 degrees,

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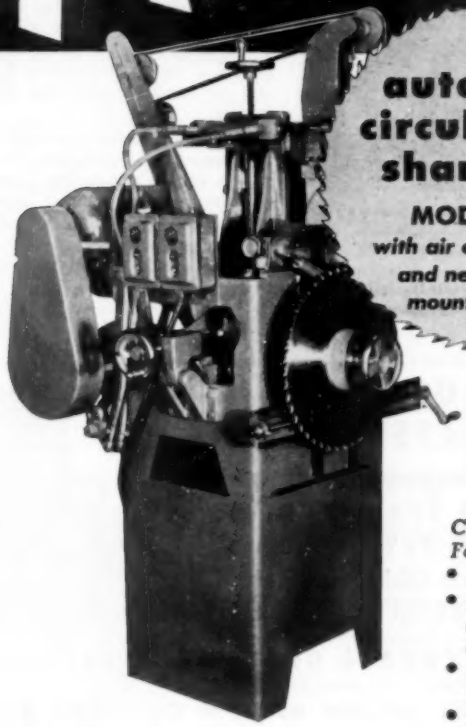

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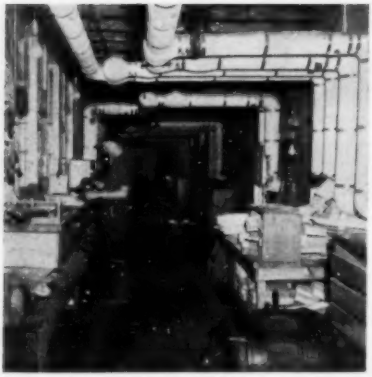

Steam main and feed pipes are well insulated to prevent heat loss in this modern kiln installation.

it was not possible to hold the kiln down to 110 degrees with equal heat to dry green lumber, when kiln length was more than 20 feet.

Steam requirements varied with individual kilns and wood species and lumber thicknesses and moisture contents being dried. Although many claimed the average use of about 2 lbs. of steam for each pound of water evaporated, when all species were included and low drying moisture content demands considered, this average often went up as high as 4 lbs. of steam per pound of water evaporated. Kiln design and construction, of course, affected net results.

In addition to the conventional wood- and coal-fired Dutch oven furnace and boiler steam generating systems and primary power exhaust systems and gas- and oil-fired boilers, various types of heat exchangers were also found in use. At a kiln installation where two boilers serviced five large dry kilns, 30 h.p. gas-fired Scotch marine boilers being used were fully automatic. With

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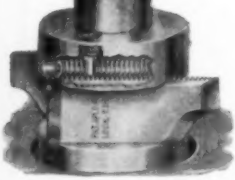

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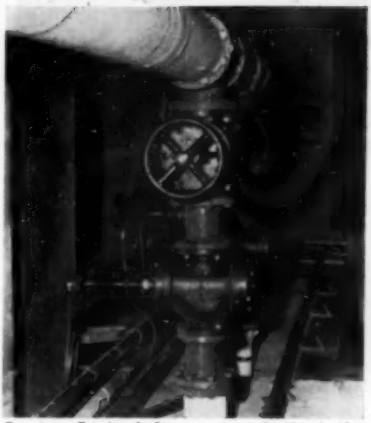
the 25c natural gas available to this operation, it was claimed that heat cost for drying seldom exceeded $1.35 per 1000 board feet of lumber dried.

In a large plant operation where part exhaust steam was supplied as a by-product of a large engine used to generate power, it was stated that using live steam at about 135 lb. gauge, exhaust steam at about 4 lb. gauge was compressed to about 10 lb. for dry kiln heating. At a smaller plant operation nearby a separate steam generator unit was being used to provide dry kiln heat that was fired with heavy oil and was rated at 50 h.p. The condensate unit was equipped with a turbine type feed pump and operation was fully automatic.

A lumber concentration yard was found operating two 40,000-foot capacity kilns to supply current demands for dry lumber. These dry kilns were serviced by an 85 h.p. oil-fired boiler which was said to use about 150 gallons of light or medium oil per day to dry the various species. In drying their principal



Courtesy Crosby & Siegars, Inc., Portland, Me.
Steam control valves maintained required pressure for heating systems of two kilns.

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Sumner Iron Works, Everett, Washington, W. Coast Rep.
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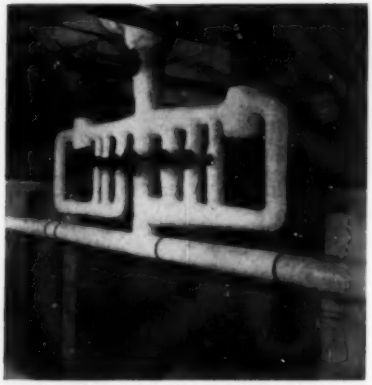


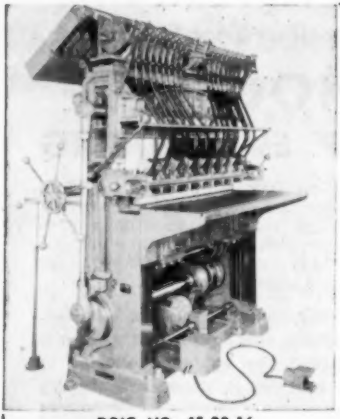
Courtesy Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Honeywell electric motorized valves, controlled by Electronik instruments regulate steam flow to heater coils and steam spray in this Imrie dry kiln.

species, pine, the operator estimated requirements of about 7 lb. of steam per board foot of sap and down to 3½ lb. of steam for drying heart.

A smaller commercial dry kiln operation was using a boiler of the package Scotch marine type to heat the kilns. This boiler did not require a Dutch oven, since it was fired with heavy oil, and it also had standby provision for light oil. It operated at about 14 lb. per square inch and was said to have capacity of developing 150 h.p. Operation of the boiler was fully automatic and it seemed quite capable of providing adequate heat for kiln drying.

Two things always happen in the steam-heated dry kiln: the steam coils are usually cold when steam is first turned on and are full of air. The steam serves to displace the air, which must be allowed to escape somewhere, and a certain amount of steam is condensed as it gives up heat to form water of



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NEW FEATURES

A. Wheel on left allows operator to adjust back gage from operating position.
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condensation and this must be drained off somehow. If air is not properly vented, the pipes will become air-bound, and if water of condensation is not removed, the coils will become water-logged. Either or both of these conditions will produce non-uniform temperature, uneven heat and poorly dried lumber.

Although the simplest way to drain water of condensation is to the lowest point of the system and outside the kiln, this is a costly and messy procedure. Drainage is usually provided at the coil by some form of trap and provision is usually made to return the condensation to the steam-generating system for re-use after proper cleaning or filtering off of dangerous foreign matter in the water.

WAPAKONETA CATALOG

A new two-color catalog just off the press is being offered by the Wapakoneta Machine Co., Wapakoneta, Ohio, to illustrate its continuing expansion and the modernization of its facilities for production of a complete line of machine knives, shear blades and cutters for the woodworking and steel industries.

This 60-year-old Ohio company recently installed four electric salt bath furnaces for hardening and tempering high-speed steel knives. These electric molten salt tempering baths, with complete automatic temperature controls, will temper one-piece shear blades more than 20 feet in length.

The catalog contains photos and complete descriptions of high-quality veneer, planer, dowel, thick slotted, corrugated high-speed, chipper, paper cutting, hog and pole knives; also high-speed shaper steel and alloy cutter head belts.

Y18 is the only Machine That Sharpens Cross Cut Saws in One Operation

Its patented and exclusive automatic swivel enables each tooth to be filed correctly as it comes along. Insures accuracy, keeps bevels true, points balanced and saw in perfect cutting circle.
Sharpen your saws, both cross cut and rip with Y 18, and *speed your productivity.*
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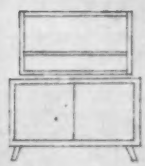

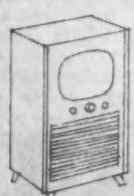

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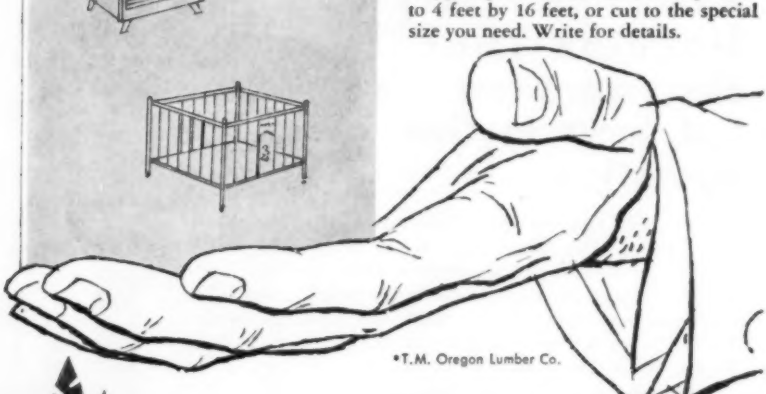
Allwood resists abrasion and moisture... hard, smooth, durable...works like wood. It bends to meet special requirements. Takes glue without sanding—laminates better. Available in thicknesses from 1/8" to 1/4"... panel sizes from 4 feet by 4 feet to 4 feet by 16 feet, or cut to the special size you need. Write for details.



*T.M. Oregon Lumber Co.

Oregon Lumber Company

Industrial Sales Office
640 S. Wilton Place
Los Angeles 5, California

Allwood Hardboard Division
DEE, OREGON

WOOD FIBER MOLDINGS

Are New Venture

By T. A. Dickinson

A PROCESS that could easily become the basis of a great new industry has been developed by Forestrong Company of Gardena, Calif., in collaboration with Weyerhaeuser Timber Company of Snoqualmie Falls, Wash.

It permits the conversion of wood scraps into products that are physically and chemically equivalent to the best wood turnings and plastic moldings for a fraction of the cost.

It involves the rebonding of wood particles with synthetic resins, and differs from older processes in the same category to the extent that it necessitates the processing of wood scraps as relatively long cellulose fibers—not as sawdust or flour-type materials. Such processing is advantageous because:

(1) Most wood scraps can be converted into cellulose fibers for less money than is required to produce wood flour.

(2) Raw material costs are reduced, because fibers can be rebonded with smaller quantities of adhesives than powder particles (due to the fact that the fibers retain much of their natural structural integrity, while the powders must be comprehensively reunited). For example, where 80 parts of wood flour would have to be mixed with at least 20 parts of resin in order to produce usable moldings, 100 parts of wood fiber can be satisfactorily mixed with only three parts of resin (by weight).

(3) Fibers tend to reinforce (and increase the mechanical strength of) resinous binders, whereas moldings containing wood flour usually have about the same physical properties as moldings made from resins alone.

(4) "Resinated" wood fibers can be molded without producing substantial quantities of scrap, because their flow properties (when they are subjected to heat and pressure) are insignificant.

A simple mechanical crushing operation enables Weyerhaeuser to convert both hard and soft wood scraps into short thread-like fibers with the moldability and other physical characteristics of wood itself. Then the fibers are individually and collectively coated with resinous films of microscopic thickness by pneumatically ejecting them through an aerosol.

The aerosol is produced by using a device analogous to a paint spray gun to permeate the atmosphere of an appropriate coating chamber with a resinous mist. Phenolics are the most commonly used resins in this operation, although other thermosets and many thermoplasts can be used to prepare fibers for the production of special types of moldings.

Fibers, thus coated, are next allowed to dry without becoming bonded or strongly adhered to one another. Then they are packaged and shipped to the Forestrong plant.

Because of their low flow properties, the resinated fibers are initially pre-

Here are typical products now being made from resinated wood fibers at Forestrong Co.

formed by Forestrong. Preforming involves briefly the use of pneumatic pressures of 200 to 1,000 p.s.i. and temperatures of 70 to 250° F. to compress the fibers to the approximate shapes of various moldings.

Preformed fibers are converted into strong, solid moldings by loading them in steel mold cavities and using temperatures of 300 to 400° F. with compressive forces of 1,000 to 2,000 p.s.i. to fuse and bond the resinous coatings on the fibers. This usually takes place during a mold cycle ranging from one to three minutes.

Weyerhaeuser and Forestrong officials inspect (from left to right) unmolded resinated wood fiber materials, preforms and finished tableware moldings which their companies have now joined forces to produce.

The exact amount of time, temperature, and pressure required to produce any given molding depends, of course, on the nature of the resinous coating on the fibers as well as on the size and shape of the end product.

Moldings thus produced could have a permanent, built-in finish if pigments were incorporated in their resinous binders prior to preforming. But, since pigmentation would increase raw material costs by necessitating the use of extra quantities of resin, Forestrong officials believe it is cheaper to have their moldings finished like conventional wood products which they closely resemble.

The raw material cost of Forestrong moldings at this writing is estimated to be about 10c per lb. Comparable moldings made with conventional plastics and fillers would have a raw material cost of about 85c per lb.

Many of the moldings produced by Forestrong require no subsequent machining, since they have all the details that are essential to their use in the "as-molded" condition. However, some are produced as standard materials which can be further processed by other firms.

The latter materials can be sawed, sanded, planed, shaped, drilled, etc., like fine grades of hardwood. Also, they can be assembled with nails—a procedure that would cause virtually all plastic moldings to crack. The spring-back of the materials is such that nail heads

low-priced

New High-Speed ELECTRIC PLANE

Nothing like it for . . .

Speed! Performance! Price!

Fastest plane on the market! Hardened spiral cutter turns at amazing speed of 25,000 RPM — gives a fast, smooth, "shearing" cut on the toughest jobs, including glue-bonded panels and hollow-core doors.

Lowest-priced plane in its class! Includes features found in other heavy-duty planes costing from $50 to $75 more: Depth adjustment from 0" to 3/32". Bevel adjustment from —15° to +45°. Precision ball bearings. Deflector shoots chips away from operator and workpiece, prevents clogging. Weight whittled down to a mere 9¼ lbs. for greater ease of handling.

Model 126

Sensationally Priced! **$95.00**

Cutter sharpening attachment available at slight extra cost.

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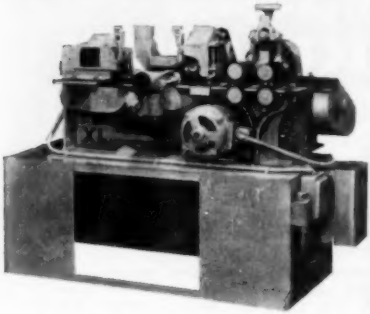

It's true, the XL MOLDMATCHER will pay you a 20% return on your investment if you run it only 30 hours per month! Let us show you how you can allow $4.00 per hour operating costs and still realize a 20% profit.

Write or phone us about your moulding problems. We will show you how the XL MOLDMATCHER fits into your production.

The XL MOLDMATCHER is made in 2 sizes — 2" x 4" and 2" x 6". If you use mouldings in this size range you owe it to yourself to learn more about the XL MOLDMATCHER.

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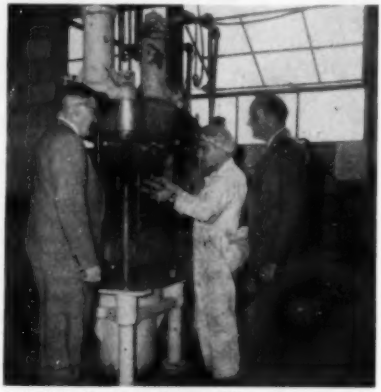
can be countersunk in their surfaces with nothing other than an ordinary hammer without producing unsightly dents or scars.

Unfinished Forestrong moldings will absorb some moisture, but not as much as wood due to their low porosity. They are not as porous as wood because fiber



A finished wood fiber molding is removed from a compression press at Forestrong Co., Gardena, Calif.

constituents can be more tightly compressed by modern hydraulic press equipment than they are by Mother Nature.

The close union of wood fibers in Forestrong products also explains why they can have more mechanical strength than natural wood materials, since top strength in either case depends on which substance has the most wood fibers in each inch or fractional inch of its cross-sectional thickness.

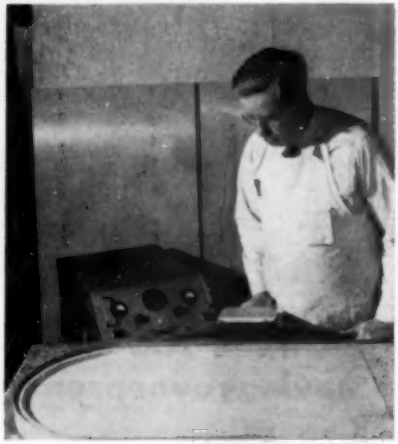
Typical products that have been made by molding wood fibers include chair backs and seats, weight-relieved core boards, cabinet and slab doors, shipping frames, flooring, glass frames, brush and tool handles, appliance housings, printing plate blocks, tote boxes, and hardboard.

"For Electronic Gluing We Find URAC 185 Beats Any Glue Around"

E. R. Werych, President
Industrial Electronic Engineering Corp., Milwaukee

"Trouble-free operation sells our new BondOtherm Electronic generator and glue gun as much as its portability, speed, and low cost. Naturally, when we demonstrate it, we take no chance on glue trouble. We use and recommend Nelson's URAC 185 because —

1. **It is more responsive** to electronic activation— contains no water, takes less time and "juice".
2. It has less tendency to arc. **Avoids risk of charring.**
3. **It does not crack,** craze or crystalize with age.
4. It requires little pressure and bonds **plastics** as well as wood, **without clamps.**
5. It sets so fast when heated, it helps underline electronic gluing's major advantage—huge **time saving."**



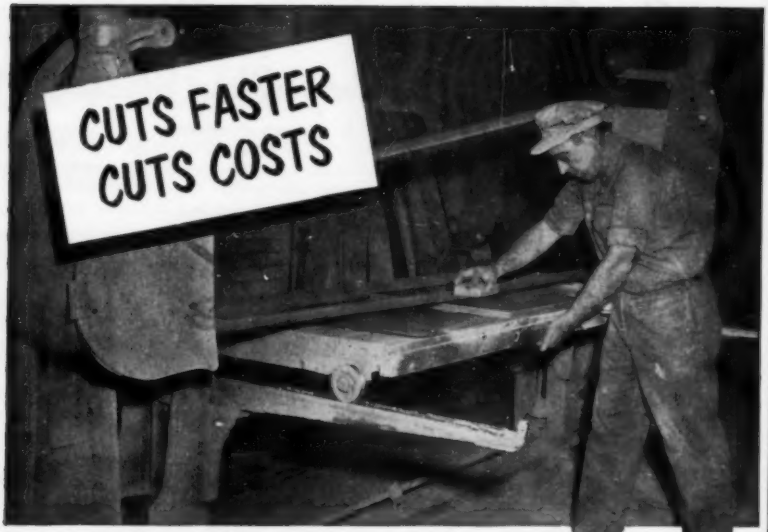
Edge-handing without clamps, using URAC 185 and BOND-O-THERM, Bay View Linoleum Co., Milwaukee.

Try it —

You can now buy URAC 185 from any Nelson warehouse, any quantity convenient—drum, 5-gal., gal., qt., pt., down to the new Nelson Handy Pack, for laboratory and home use.

Write or **mail $1 for sample** — *Dept. WD-8*

THE NELSON COMPANY Iron Mountain, Mich.



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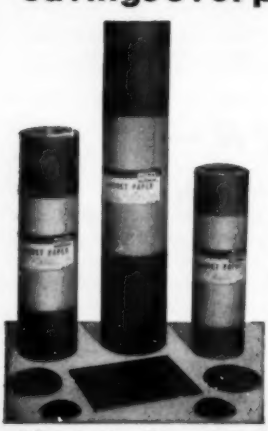

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Customers tell us that "on the job" tests have proven Mid-West Resin Seal Garnet to be superior to other coated abrasives costing much more. That is why we urge you to make a test run with Mid-West and compare it with the brand you are now using.

Designed specifically for the woodworking industry, Mid-West Resin Seal Garnet material is made with medium or heavy weight paper and all cloth backings, and flexibilities in belts, sheets, rolls or discs . . . or in any other standard form.

Why not let us show you how we can cut costs on your sanding operations? There is a Mid-West field representative ready to serve you. Write us for his name.

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Furniture Manufacturing

A CRAFT WITH TRADITION

Part 5

By H. H. Connelly

ONE cannot speak of the progress made in methods of furniture production without pausing to reflect upon the ingenious tools that have made it possible to carve a score of chair legs in minutes; or shape a dozen arms in one pass; or bore 30 holes with one handling.

Colton said: "The wisest man may be wiser today than he was yesterday, and tomorrow than he is today. Total freedom from change would imply total freedom from error; but this is the prerogative of Omniscience alone."

While marveling at the outstanding display of modern equipment shown at the recent Forest Products Research Society meeting in Grand Rapids, one wonders what tomorrow will bring if "The god of yesterday will be the starting point of tomorrow."

Changes Through High Frequency

Not too many years ago if you had suggested the assembly of a chest, or chair in minutes instead of the necessary hours set aside in a hot glue room for curing, you would have been bashed over the head with an upholstering hammer.

High frequency or radio frequency as it is commonly known in the woodworking profession, has improvements today that were unheard of even 12 months ago.

For example, until recently millions of Btu's created by the rectifying tubes, were discharged as waste. Today the new units are putting this waste heat to work by blowing the hot air over the wood, curing bothersome glue squeeze-out, and shortening the curing cycle.

Radio frequency has its greatest advantage in assemblies where complicated forms and jigs are required.

Without some method of setting the glue line quickly, it is necessary to have many dies and forms for volume production, chiefly curved plywood for radio cabinets, drawer fronts, chair seats and backs, etc.

An eastern firm producing modern furniture recently styled and put into production a cocktail table with an odd curved plywood rim. To produce this unit by the cold bonding method would have required a hundred forms, each cumbersome to handle and expensive to make. With radio frequency heating, two forms and ten less men were ample.

Thus we see that high frequency with its peculiar behavior of electronic waves, is ingeniously adapted to the gluing of irregular surfaces, more so than hot gluing with its complicated and expensive metal dies. Especially since the heat generated in the interior of the mass by high frequency waves

A new contact sander. Production increases of 25% are reported by the manufacturer.

is raised to the same degree of intensity as the outer surface near the caul plates.

This excellent state is brought about indirectly by extremely short radio waves chasing each other back and forth between the positive and negative electrodes.

Directly these invisible waves of energy produce heat by distributing the molecules of wood and glue somewhat like a horseshoe magnet disturbing iron filings on a piece of glass. As the magnet is moved the particles of iron change. In high frequency this movement is many millions of times per second because the molecules of glue must, like a compass prodded with the wrong end of a magnet, change direction with each shift in direction of wave travel.

It is this shifting of the molecules that produces friction and friction generates heat. Since molecules are as thick in the interior of the mass as on the exterior, it is quite understandable that there will be as much disturbance here and consequently as much heat as on the exterior.

For the factory tooled up to make curved furniture parts there is little change necessary. The metal facing on the forms, in most instances, can be used for the positive and negative poles.

For the firms tooling up for the production of curved parts a careful consideration should be given the advantages of electronically gluing.

One other outstanding feature of high frequency gluing is the time lapse between gluing and machining. When a curing time of 10-12 hours outside the die is required for cold gluing, high frequency glued parts can be machined directly after removing.

If you are contemplating high frequency, there is at your disposal a number of firms making outstanding units to fit the variable needs of your factory and engineers trained to help work out your particular problems.

How High Frequency Fits Your Furniture Core Setup

Is your production of solid lumber cores geared to a high output or medium load? Is there a constant high load or is it intermittent with peak demands?

A high output at the core gluing machine will demand a machine of large capacity in kilowatt output. The first step, therefore, is to determine the peak demand at the high frequency machine and work backward. If the demand is 600 square feet per hour, select a machine large enough to do the job, or better still plan on two machines. In case of mechanical failure, the production will not be entirely closed down. In general, it is not wise to plan equipment for the minimum demand. More economy results from the installation of a machine slightly larger than the demand rather than one that just meets the requirements.

Further, a gluing machine that can

be operated with one man is more efficient than one which requires more than one operator. This is true only if the machine is designed for one man operation.

One high frequency machine now on the market claims an output of 3,000 to 6,000 square feet of glued up stock per day for one man.

The shooks are laid on a turntable, rotated under the pressure, the power applied; and while a cured core is being removed from the opposite side of the turntable, one is cooking.

As a result of this work saving device, one man is able to produce as much as two or three men by the clamp carrier machines.

The Electronic Gluer Is No Cure-All

In this atomic age we are prone to accept anything in the name of electronics as being another mechanical brain, capable of solving any woodworking nightmare. With the high frequency core gluing machine, we are disappointed when we find the same old complaints cropping up in the panel gluing operation: open joints, warped panels, poor bonds.

Wood to wood contact is still of the first importance in gluing with high frequency and urea formaldehyde glue; for we find the gap filling properties of this type glue on the bottom of the scale. With the carrier type glue clamp we are able to compensate for a poor joint by applying excessive pressure where needed.

Neither will you find the electronic gluer a panacea for warped and twisted stock. First because it is difficult to apply a joint that will be at right angles to the surface of the board—a necessary step if wood to wood contact is to be realized when the board has been pressed flat in the machine. If sufficient pressure can be applied with the pressure rolls in the rip saw or jointer to completely flatten the board while applying a joint to the edge, we are faced with the job of applying enough top pressure to flatten the panel in the machine while the glue line is curing. The danger, if the glue holds, of the panel rupturing at a later date from the internal strain, is real and probable. The best answer yet is to make chip cores from twisted stock.

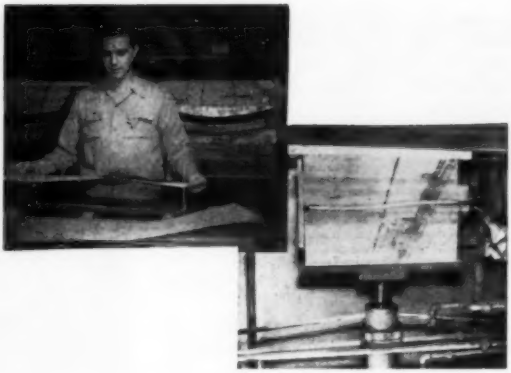
A Curtis semi-automatic stroke sander conversion unit.

The Guide Line Is New

One of the difficulties that takes years of experience for a rip saw operator to overcome is that of cutting a defect from a board without undue waste. One way of taking the guess work out of rip sawing is to install a guide line light.

In most plants it has proven the answer to the problem of reducing waste. The guide line light shows the operator at all times, on the full length of the board, exactly where the saw will cut. In addition to saving in material, it speeds up the operation. The operator can handle more material and can produce better work.

It is simple and economical. So eco-



Fancy veneers are spread with glue. Then unit is placed in an electronically-heated press which shapes them into a contoured drawer front.

nomical that in most plants the additional savings in material have more than paid for the investment the first year.

The lamp is mounted in universal, easily adjusted mountings; and the beam is transferred through a specially designed Bausch and Lomb lens to concentrate the light rays and protect them in absolutely parallel lines.

A taut wire, mounted at the bottom of the hood, is projected as a shadow upon the wood. The shadow is lined up with the saw when installed. A green-horn can take hold of a straight line rip saw, equipped with a guide line light and do a fairly accurate job of removing defects, splitting boards and edging with little waste.

Applications for the guide line light are not confined to ripping in the furniture factory. For example, it is remarkably useful on the double end tenoner, double cutoff saw and shooking saw.

One furniture factory has guide line lights mounted over the tenoners, in line with each saw. As an adjustment is made to trim stock, the shadow thrown on the parts will tell the operator instantly where the stock should be placed on the feed chain to cut off a defective part or how to set the back guide to trim accurately.

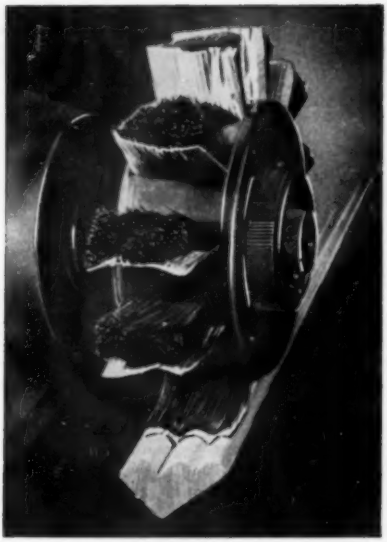
Rip Saws That Produce A Glue Joint

When glue joint rip saws were first proposed to the woodworker over a decade ago, they were viewed with suspicion. Many old timers pooh-poohed the idea and said it would never work.

When tried, many failed to produce a joint sufficiently qualified to be called a glue surface. The major reason, however, was not the method, nor the saw. The saw failed to produce a satisfactory glue joint because the saw feed chain was worn, the mandrel untrue and often the construction was not suitable for producing a consistently fine joint.

To economically manufacture furniture panels, it is almost imperative, especially where competitive labor markets call for a high rate of pay, to finish the joint at the time of removing the defect.

Today, this is standard practice, not only in the manufacture of plywood lumber cores, but for those plants making solid lumber furniture where the joint must be the best.



Note how the brushes force the abrasive cloth down into the grooves.

Sand-O-Flex is being used for finishing spiral lamp stands.

Used portably, Sand-O-Flex sands intricate parts without "flatting" contours.

13,000 sanding strokes a minute

on curved, irregular wood surfaces

Sand-O-Flex gets in and around complicated parts where no other sander can reach. The tedious jobs formerly done by hand are now successfully sanded at top speeds.

Model 650C (above left) consists of 12 abrasive strips backed up by 12 replaceable brushes attached to a metal wheel. As the wheel spins the brushes mold the garnet cloth to the work shape, and when rotated at the usual motor speed you get 13,000 sanding strokes per minute! Compare that with any other form of contour sanding.

The abrasive strips feed out from a central magazine. Refill cartridges are supplied in a wide range of grits, from coarse to very fine, for all types of sanding. Easily loaded—no looping, gluing, or fastening ends. By changing to aluminum-oxide abrasive cartridges, Sand-O-Flex may also be used for finishing metals, plastics, rubber and other materials.

Sand-O-Flex is an attachment, fits your present power tools, portable or stationary. No need to buy stands or special equipment. Four models now available—from light duty to heavy production-line runs.

There is a job for Sand-O-Flex in every woodworking shop and there is a Sand-O-Flex sander for every job. See your abrasive supply dealer for a demonstration—or write for catalog and prices.

MERIT PRODUCTS, INC.
4023 Irving Place, Culver City, California

Manufacturers of SAND-O-FLEX and GRIND-O-FLEX abrasive tools

Arrow shows guide line light which casts dark shadow.

There are a number of important qualifications a good glue joint rip saw must have. (1) Glue joint rip saws, to be serviceable, are of heavy gauge; generally 12 to 16 inches in diameter. Select the heavier gauge if a choice is possible, and the smallest diameter.

(2) A swedge tooth saw is easier to maintain and joint.

(3) Train the saw operator to place the proper joint on the saw at the start of the run. Don't try to joint the saw off the machine.

Improvements in Sanding Are Many

Not too many years ago it was proposed that a belt sanding machine be developed to operate at 5,000 f.p.m. The idea was discarded as fantastic. No belt could stand the terrific strain.

Today a machine that operates under 5,000 feet is considered an exception. Even 10,000 and 12,000 feet are considered normal.

Two factors of major importance have contributed to this improvement. The makers of machine tools have discarded the old babbit bearings and are using

ReNew GIVES NEW LIFE TO SAND PAPER AND CUTS SANDING COST **50%**

keep your sandpaper cutting for you with ReNew. Apply . . . let is dissolve the pitch or resin . . . then brush it off with a scrubbing brush. It's so easy and quick and makes your sandpaper last at least 3 times as long.

ReNew increases sanding machine efficiency . . . paper lasts longer . . . less changes necessary.

ReNew is non-inflammable.

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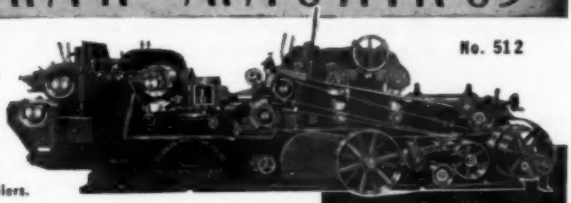

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Speeds up to 325 feet per minute.
8" dia. cutting circle.
Six 12" dia. feed rolls.
Single and double profilers.

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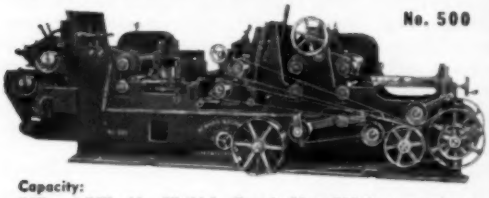

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precision ball bearings and fabricating machines with rigid frames. The second contribution has been on the part of the abrasive manufacturers who have, through research, developed new abrasives and the adhesives to bind them to the backing.

Animal glue, which was the only adhesive softened at high temperatures, led to the future of sanding belts. Now the new synthetic, waterproof, boil proof, and heat repellent are used to bind the abrasives and backing.

There are a number of necessary steps in sanding cabinet wood in the white to produce an excellent finish. The exact steps and machines upon which you can do these operations will vary with each plant and the available machines. For instance, one plant may drum sand for the first operation and do the polishing on a stroke sander. Others feel the first sanding should be done on a stroke sander followed by the polishing with a finer belt on the same machine. Frequently a last sanding is performed by a jigger sander to remove any raised grain just before the work goes on the finishing line. Facilities often dictate the best method.

No attempt is made, therefore, to define the correct method for sanding wood in the white for this reason. However, we do find this much in agreement among all finishers of quality furniture: (1) a rough sanding must precede the polishing if any degree of economy is expected. Few will dispute the fact that more mileage can be expected from a 2/0 belt over a 5/0 belt. (2) Each sanding operation should be progressively from a coarser grit to a finer grit paper. This applies to the drum sander. For example, a ½-60 on the first drum, 1/0-80 second, 2/0-100 third drum, and 3/0-120 fourth drum.

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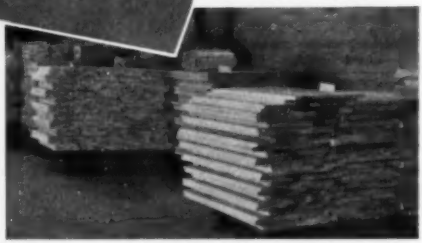

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A belt stroke sanding to remove all drum sander marks should follow. A 4/0 belt gives a satisfactory sanding if performed well. You may prefer a finer belt if no further sanding follows. But, a 5/0 on softwoods has little merit over a 4/0 abrasive. Hardwoods such as maple may require the finer abrasive.

Since all parts for case goods are sanded in the flat before assembling, an excellent practice is to sand the assembled part with a jigger sander just before the first coat of finishing material is applied. You will find a glue size applied at this time gives excellent foundation upon which to apply the first coat of material.

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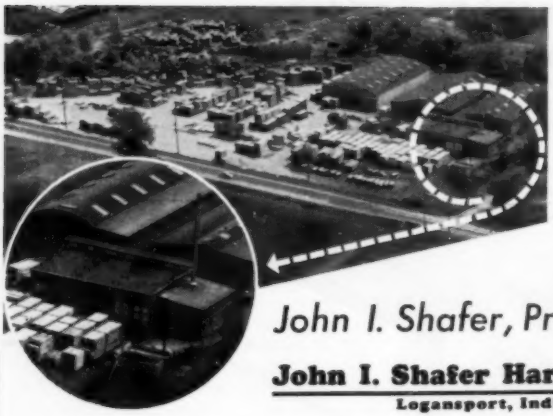

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Logansport, Indiana

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KILN DRYING *Forum*

Beginning with this issue of WOOD WORKING DIGEST, we plan to publish questions and answers on kiln drying. Most of these questions will be answered by Paul H. Graham, "country doctor" to the woodworking industry. Send in your questions and Mr. Graham will try to diagnose the problem and obtain the best professional advice possible to answer your questions.

Question

In a recent kiln drying discussion the terms "sensible heat," "latent heat of evaporation," and "total heat" were used. Can you explain their meaning and proper application?

Answer

The terms were probably used in explanation of the application of heat. After the temperature of 212 degrees is reached each pound of water is known to contain about 180 Btu. (above 32 degrees F.). This quantity of heat is commonly known as "heat of the liquid" or "sensible heat." To change the liquid into a vapor at atmospheric pressure (14.7 pounds per square inch absolute), it is necessary to add about 970.2 Btu. to each pound of water after the temperature of 212 degrees F. has been reached. The temperature is believed to remain constant during this transition period. The quantity of heat added is known as "latent heat of evaporation." The sum of the two quantities (180 Btu. and 970.2 Btu.), 1150.2 Btu. per pound, is the "total heat" in the vapor formed when water boils at atmospheric pressure.

Question

What is the easiest way to remove condensate from the dry kiln heating coils?

Answer

According to Forest Products Laboratory Report No. R1663 (Steam Heating Systems, etc.), "The easiest way to remove the condensate is by a valve at the lowest point of the line. By opening this valve, the condensate can be blown directly into the atmosphere or to the return line. This practice, however, results in a large loss of steam and increases steam costs. Therefore, a steam trap that traps the condensate and returns it to the boiler, results in the utilization of nearly all the heat in the steam. Such traps not only serve as a means of draining the condensate from the coil, but are so constructed as to release trapped air mixed with steam. Thus they prevent air binding and the subsequent loss of kiln efficiency."

Question

We have been advised that the piping system in our dry kiln does not provide suitable expansion joints. How do we determine the amount of expansion that occurs within the kiln for a given length of pipe?

Answer

A kiln engineer with considerable installation experience advises that the ex-

pansion for any length of pipe may be found by taking the difference in increasing length at minimum and maximum temperatures, dividing by 100, and multiplying by the length of line under consideration.

Question

Is it true that when the temperature gradient method is used in high frequency drying that drying conditions similar to those obtained in the dry kiln of conventional design are possible.

Answer

Experiments conducted by the Forest Products Laboratories at Ottawa, Canada (as reported by D. G. Miller at an FPRS meeting), indicate that the increase in drying rate obtained with the high frequency temperature gradient method is limited by the fact that if too high a gradient is imposed the humidity of the cool, circulating air is lowered to a dangerous level by warmer surfaces of the wood. Also, in contrast to the rise in humidity which occurs in the conventional kiln, there is a tendency for moisture gradient to be set up from side to side of samples dried by the temperature gradient method, due to progressive lowering of the humidity of the air as it passes over the heated wood.

Question

We are currently using an infra-red drying oven for finishes. Do you believe a similar device could have practical application for drying lumber?

Answer

We have heard that a concern in Tennessee used infra-red radiation for drying lumber, but know of no current installations using infra-red as a lumber drying medium. Generally speaking, infra-red radiation is not favored for lumber drying due to the fact that no means are provided for temperature and relative humidity control that is vital to good kiln drying. Furthermore, infra-red radiation heats only the boards exposed to it and the heat required to soak into the center of the board must be of a magnitude sufficient to raise the temperature at the surface to a point where defects and degrade occur.

Question

We have been advised that by increasing air velocity in our kilns our drying periods can be shortened with the same steam source and possibly lower power requirements. Would this change involve physical changes in the construction of our kilns other than suitable fans and fan mountings?

Answer

It is difficult to answer this question with the limited information available but it is usually required to change the kiln building to provided increased spaces for air flow. In a typical conversion of an internal fan kiln to provide an air velocity up to 500 feet per minute on 5/4 lumber the only construction changes required were raising the roof and building up the side and end walls although it was necessary to excavate under the rails to provide

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area for air flow and eliminate resistance at this point.

Question

The lighting inside our kiln is not too good and I have difficulty in finding pile samples during the kiln run for testing. Is there anything I can do to locate these in a hurry?

Answer

A New England kiln operator with a similar poor lighting condition in his kiln bores into the edges of the sample boards and drives small reflector discs in the holes which readily show their position in the pile.

Question

Do fans deliver 100% efficiency in an internal-fan kiln?

Answer

A fan engineer advises that the top efficiency for any kiln fan is seldom more than 75% and will be lower when the fans used are reversible, as a fan attains top efficiency in one direction only.

Question

We are considering the purchase of a dry kiln which has the fans installed within the kiln. We have been told that these fans are driven by glass-wound motors which will not be affected by the heat. Can you give us any information about this type of motor that we may evaluate possible working life?

Answer

A manufacturer of special motors of this type for dry kiln inside installation advises that their motors have been continuously operated since 1937 without major repairs being required. The motors are wound with double spun glass wire with high temperature bonding or silicone varnish and have been run up to 480 degrees F. without deterioration. Slot and phase insulation is special fiberglas and mica and high temperature varnish. Leads from the motor into the special terminal box are all sealed off and silicone rubber leads are glass wound with silicone varnish dips. Silicone grease is used in the bearings and motors using silicone grease are reported to have run up to 5 years without need for regreasing, according to this manufacturer who reports some 6,000 similar units in operation throughout the country.

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Architectural Woodwork Institute

It was just in May 1953, that 36 architectural woodwork manufacturers, who are geographically representative of the United States, met at the University Club in Chicago to review the results of a preliminary survey of the building industry made by the Byrne Marcellus Company, a professional trade association management firm. After hearing results of the survey, these industry members unanimously voted to form what was then known as the National Organization Development Committee of the Special Millwork Industry. They decided to work toward bringing together a convention on October 15, 1953, at which time it would be determined if there was sufficient interest among attending members of the convention to form a national trade association in the architectural woodwork field. That was only about a year ago. Today, the Architectural Woodwork Institute is a strong and growing trade association with approximately 225 members from the United States and Canada. Sparked by Institute President Chas. A. Rinehimer, who is also president of the 87-year old Rinehimer Bros. Mfg. Company in Elgin and Rockford, Illinois, and guided by a board of directors made up of outstanding millwork men throughout the United States and Canada, the institute was founded on October 15, 1953 and launched an architect relations program that has grown in scope and stature each month since the institute has been in existence.

Prior to convention time last year, a poll was taken among industry members in an effort to determine what seemed to be the most logical program to be undertaken if a trade association in the architectural woodwork industry was to be formed. During the summer months of 1953, an extended survey was made by the Byrne Marcellus Company among architects from coast to coast who reported that they sought technical and educational material on the use of architectural woodwork. They stated in effect that the sales efforts of manufacturers of competitive materials such as steel and aluminum far exceeded the marketing developing activities of the wood and lumber interests and these manufacturers of substitute materials were able to give architects information and facts that made it easy for them to specify their product. Although many other subjects were suggested, architect relations and selling more wood and woodwork led by so wide a margin that it was voted unanimously at the convention to devote the first year's efforts and activities toward developing this program.

Chas. A. Rinehimer, president Architectural Woodwork Institute

The architect relations program consists of a series of technical and educational brochures that are being sent to about 9,000 architects of members' choice throughout the United States and Canada approximately every two months. This service to architects is highly personalized. With each mailing the architect receives an envelope containing a card giving the name, address, and phone number of the area institute member who is supplying him with this much-needed service. A full time architectural consultant serves on the staff of the institute's management office and prepares copy for all brochures. This copy is submitted to an architect relations committee made up of institute members who, in turn, add their ideas and suggestions to the contents of the brochure. This consulting architect is in close contact with the A.I.A.

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in Washington, D.C., to obtain from them their comments on how the information should best be presented so that it will be most helpful to architects. Mailing pieces that have been sent to date include: an announcement piece, a general introduction to the subject of woodwork, cabinet work, and the current book deals with wood frames and windows.

A barrage of letters has come to the management office of the institute from architects from virtually every corner of the country requesting that their names be added to the mailing list. Architects who have received brochures have made such comments as: "I have often wished for some source of up-to-date information on the rapidly developing field of architectural millwork. Such a source of information seems to be what you are now offering in your forthcoming series of brochures . . ."

Over 60 architectural schools also receive this series of brochures and many unsolicited letters have come to the institute requesting that additional copies be sent to the colleges and universities for graduate students and for their library reference files. Individual members report that they have received many letters and calls from architects thanking them for the announcement piece and brochures No. 1 and No. 2. They indicate that they want to continue to receive these brochures as rapidly as they can be prepared because these booklets have been extremely useful in detailing architectural woodwork. Future brochures will cover such subjects as: paneling, exterior doors and cornices, moldings and interior trim, plywood applications, stairways, etc.

The 63 members who founded the institute in October knew that no program could be a success without a larger and more geographically diversified membership. Hence, along with the architect relations program an active membership drive has been pursued since that time and, as has been indicated above, membership is now nearly four times as great as it was

on the date the institute was founded. A.W.I.'s goal is 300 active and sustaining members by the time of the second annual convention which again this year will be held October 15th and 16th. Membership extension has most effectively been carried on by the holding of regional meetings which are called by institute members. A.W.I. has a field man who is actively engaged in assisting institute members to conduct these meetings.

To supplement the architect relations program and to assist members in their contact work with architects, the Byrne Marcellus Company, which is the institute's management firm, has gathered together into one volume a reference and data file which is comprised of much of the most outstanding literature prepared in recent years on wood and wood products and their relationship to architectural woodwork. This file has proved to be of real value to institute members in helping to present the story of wood to architects and to answer their questions in a clear, concise technical manner.

Future activities of the institute this year include a publicity and public relations program, both at the national and local level, and the enlistment of supplier support which has done much to sustain the institute's first year's budget.

Although the institute is young, it has become a subject of very real interest among industry members. This is the first step architectural woodwork manufacturers have taken as an industry to meet the onslaught of competitive materials and to restore wood to its rightful place in the vast construction industry. It is the industry's trade association—it is the industry's job to make it succeed.

Architectural woodwork manufacturers and their suppliers who are interested in joining A.W.I. should contact Architectural Woodwork Institute, 332 South Michigan Avenue, Chicago 4, Illinois.

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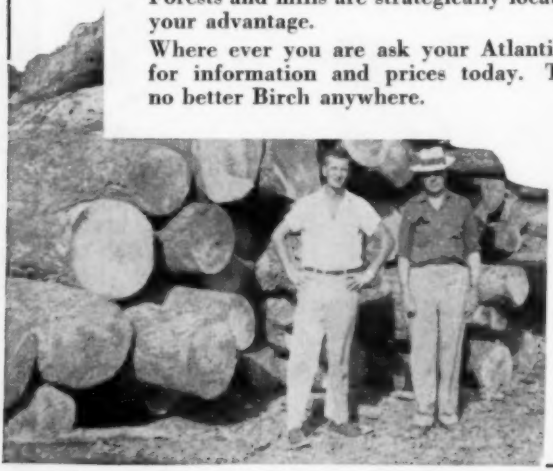

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SECTION

STYLES in FURNITURE FINISHES

Part 2

By W. E. Martin

THE effectiveness of finishes in retarding wood moisture change has been publicized by Forest Products Laboratory as long ago as 1930. However, popular ideas about it are still mostly erroneous.

The following points are basic to an understanding of the relation of finishes to wood moisture change:

1. All coatings are permeable to some degree to water and water vapor. They do not make wood waterproof, do not alter its eventual capacity to take up and lose moisture, or to swell and shrink proportionately.

2. Coatings delay the absorption and loss of moisture by the wood. Under changing conditions of dampness and dryness, coatings hold the wood closer to an average moisture content and dimension than would be the case without protection. Protection is most effective when the conditions of exposure fluctuate rapidly. It becomes useless for prolonged exposure to a steady extreme of dampness or dryness. Coatings are much more effective against brief exposure to water in liquid form than they are against one or two weeks of exposure to moisture saturated air.

3. Some coating materials are more effective than others. Oils are poor; varnishes are much more effective, short oil varnishes being superior to long oil varnishes. Lacquers are nearly as effective as varnishes in the same film thickness. Pigmented coatings—within limits—are more effective than clears. Coatings which contain aluminum powder or other flake particles are best.

4. Absorbed coatings, such as linseed oil or penetrating sealers, applied by superficial methods of spraying, brushing or dipping, are relatively ineffec-

tive. You can't plug the wood pores and stop moisture. It is necessary to have a uniform and continuous coating of reasonable thickness, free from pinholes or thin spots where fibre comes through the surface.

5. The greater the film thickness, the greater the moisture impedance (within limits). In general, it is not possible to get effective moisture protection with a single coat of any material.

6. For effective protection, the coating must be applied to all surfaces through which moisture might gain access.

In general, the coatings of lacquer, varnish or synthetic normally applied on the exterior surfaces of furniture provide sufficient protection against water or moisture absorption for the purposes of interior service. The chief interest of furniture manufacturers with reference to the moisture protective value of coatings is in connection with interior coaters, back coaters, drawer coaters, and the like. Undoubtedly, it has been pointed out in previous sessions that warpage of free panels can be caused by unequal coatings on the two sides—one allowing faster absorption of moisture than the other. The ideal condition would be to apply the same coatings to the backs as to the faces, but it would not be economical. If only a single application of back coating can be allowed, the most effective material would be a short, quick setting non-penetrating pigmented varnish, applied in a good heavy coat. Single coats of water repellent sealers (wax-resin solutions) are more effective than single coats of penetrating sealer or lacquer. For more reliable protection use two coats. For example, two coats of lacquer sealer, or one coat of sealer and one coat of lacquer might be used.

Much study has been given to preventing swelling and sticking of drawers by the use of coatings. Minimum requirements for appearance and feel of the drawer interior can usually be met by staining and sealing, or by using colored sealer, frequently followed by sanding and waxing. Such a coating has low moisture impedance. For even moderate effectiveness, the outside of the drawer body must also be coated. Probably the most effective simple operation is to seal and sand the drawer interior, then dip in a water repellent sealer of the wax-resin solution type. The inside is wiped after dipping. This coating has some lubricating action on the drawer slide. At best, the stabilizing action is not very great. The only way to prevent sticking of drawers is by fitting them with sufficient tolerance at a wood moisture content which will approach the maximum likely to be encountered in service.

Durability of Wood Finishes

We are speaking of durability here in the sense of resistance of checking, marring, scratching, cracking, in ordinary service exposure; as distinct from damage by water, beverages, etc. Wood finishes as a group have a rather poor reputation for durability. While there has been much discussion of improved durability, a large percentage of the production finishes used today are still less durable than could be desired. They lack toughness and adhesion, they mar too easily, they show some degree of checking or cracking failure after a year or more of service.

Finish suppliers and furniture manufacturers are mutually responsible for this situation. Properties of toughness, adhesion, flexibility, are compromised or even disregarded in order to get fast production and initial appearance. The emphasis is on high build, fast hardening, ease of sanding and rubbing, best polishing characteristics and absence of shrinkage. Unfortunately, these quali-

ties are diametrically opposed to the qualities of long range toughness and durability. Coatings formulated for maximum build and hardening speed may seem tough enough the first day or for a week or so, but invariably they become too hard and brittle after a month or so. They mar and scratch too easily, they may even check just standing around. While "cold check" failure has been widely discussed and blamed as a cause for all kinds of checking failure, temperature change probably has little to do with much of the checking encountered in service.

To produce finishes which will retain toughness and distensibility for a long period of time, we must inevitably sacrifice something in build and hardening speed. In general, the raw materials which produce maximum toughness are of large molecular structure. Therefore, they have poor solubility and viscosity characteristics. Lesser amounts of them can be used within the range of good spraying viscosity. They tend to release solvents more slowly, they polymerize at lower speed. In short, they do not harden as fast. The plasticizing ingredients which are added to produce flexibility and distensibility likewise cause slower hardening and softer final condition.

A familiar example of the compromise of durability for good production characteristics is the wide use of fast hardening, free sanding sealers. These sealers can be sanded in as little as 30 minutes air dry; powder down freely and never load or clog the paper. They invariably detract from adhesion and toughness, and they accelerate checking failure. Good sealers of reasonable build and sanding are available.

Similarly with topcoat lacquers, the emphasis on build, speed and polish pushes us away from best durability. The drying speed of lacquers is widely overrated and misunderstood. Finishes built up with one coat of good quality

"Knock it off, Bud, here comes the boss!"

sealer and two or more coats of reasonably tough topcoat are not sufficiently hardened and shrunk for best rubbing at 24 hours air dry. They may polish to very satisfactory initial appearance but will show after-shrinkage and reappearance of wood grain pattern as the drying and hardening continues. They will often develop a haze or bloom after rubbing. Much better results are obtained if hardened 48 hours before rubbing and still better at 72. In the effort to get maximum results when rubbing is done after overnight dry, formulators must use hard, high melting point resins which release solvent and harden quickly. They reduce plasticizer to the minimum. In order to get high solids and build they use low viscosity nitro-cellulose or reduce the quality of nitrocellulose. The result is a lacquer which works beautifully in production, but becomes very brittle after only a few days.

We have the same problem in synthetics, especially those of the air dry type. In the popular urea-resin types a high content of urea or the addition

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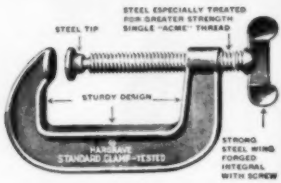
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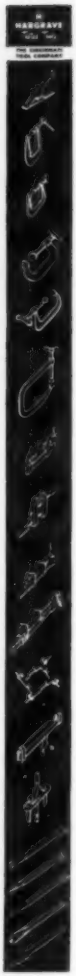


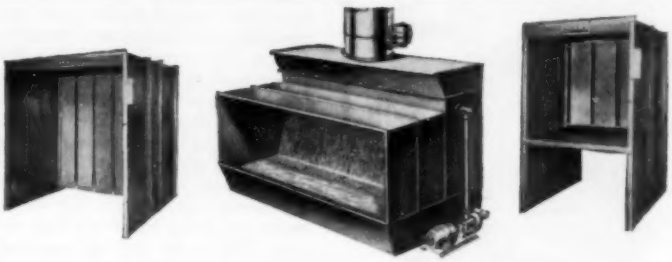
of other hard resins, produces fast hardening, good build and good polishing, but greatly increases the danger of film checking after a few months of service. Types which are lower in urea-resin show less build, do not harden as rapidly, are softer at any stage of dry, are hard to rub and polish, do not take a sharp, high polish; but are practically immune to checking failure.

With older type oleo resinous varnishes, still popular with some furniture manufacturers, it is virtually impossible to produce a material with high build which will harden overnight to rub or to pack and which will not become excessively brittle after a few months. There are varnishes with durability equal or superior to best lacquers or synthetics, but they will not work on fast schedules.

Granted that in production finishing there must be some compromise of durability in order to stay within reasonable time and cost limits. But you will be well advised not to overdo the demand for build, speed and production ease. Use sealers of reasonable toughness, even if not so fast and free sanding. Use lacquers in the medium solids range and of medium hardening speed. Prepare to allow more time for hardening and shrinkage before sanding, rubbing and polishing. Expect some toughness in sanding and rubbing. At the least, do not adopt a high build, fast hardening, sharp and easy polishing finish without some testing. If a lacquer system, keep it under observation for at least two months, and with an air drying synthetic system watch it for at least six months.

Heat Resistance

Organic finishes as a group are unstable to prolonged exposure at temperatures above 325 to 350°F. Above that we can use organo-silicone materials up to about 500 and when combined with metal particles even up to



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1,000. Since wood also is unstable in these high temperature regions we need consider heat resistance of wood finishes only in the region well below 300. The upper limit at which wood and our best practical production finishes will resist hot dishes or other heated surfaces for any length of time is somewhere around 250. Most people realize that baking dishes fresh out of the oven, heating appliances, etc., should not be set directly on wood furniture and will use pads. The upper limit of practical heat resistance expected by most users of wood furniture is in the boiling water region, a little over 200. Good lacquers, varnishes and synthetics are available which meet this requirement. We test heat resistance of finishes by placing a soup plate previously heated in boiling water directly on the finish and filling immediately with vegetable oil heated to 212°F. We expect a heat resisting finish to take no printing, whitening or other damage from this test.

With reference to burning cigarettes there are no practical production finishes which may be applied directly to wood and which are completely resistant to scorching. The catalyzed phenolics are best, the urea resin types are second, varnishes as a group are third, and nitrocellulose lacquers poorest. There has been some use of a laminated panel construction having a layer of aluminum foil between the surface veneer and cross banding or core stock. If coated with a catalyzed phenolic this shows only slight scorching under a cigarette test. With the urea synthetics, the scorching is still considerable. In our opinion, there are still no practical "burn proof" transparent wood finishes. Another angle related to heat resistance is the printing which results from packing pressure under warm conditions of shipment or storage. Informa- facturers by a committee of the Radio/ Television Manufacturers Association indicates the maximum no print limit

for practical lacquers is ½ lb. at 110°F. or 1 lb. at 90°F. The print resistance depends a good deal on the coating thickness and on hardening time before packing. In all coatings print resistance must be compromised to get satisfactory check resistance. Within the limits of satisfactory check resistance we can get better print resistance with urea-synthetics than with nitrocellulose lacquers.

Water Resistance

All organic coatings are permeable to some degree by water and water vapor. The resistance to water penetration depends on the type of coating and the thickness of coating. Water resistance as understood by the buyer of furniture generally means resistance to damage by spilled water lying on the surface. He expects a finish classified as water resistant not to crack or turn white under exposure of perhaps 24 hours to spilled water.

Many good lacquers, varnishes and synthetics if applied to coating thickness not less than 2 mils after rubbing —which means two good coats of at least a 21% solids lacquer over sealer, or one good coat of varnish or synthetic over sealer—meet this requirement.

Damage from spilled water is something of a problem with solid woods, especially hard maple, if adequate coating thickness is neglected. We have encountered this difficulty on solid maple furniture more than any other type. We can show conclusively that such damage takes place quickly in spots where the finish is rubbed thin with resulting minute pin-holes or with the wood fibre coming very close to the surface. With thicker coatings of the same material there is no damage even after 24 hours of standing water. We have also encountered this trouble in very thin, close-to-the-wood finishes on walnut, mahogany and other woods. We have found it especially with bleached finishes of this type and have traced

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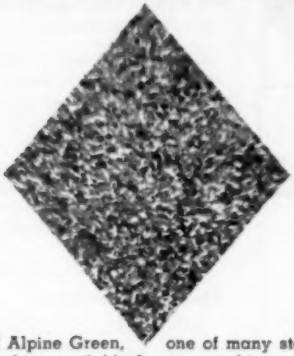

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it to minute pin-holes resulting from the bubbles which are often encountered over incompletely dried bleached surfaces. We have also encountered it in finishes where small bubbles in the film were caused by improper timing of oven dried systems—specifically, the application of coatings over hot surfaces or the movement of wet coatings into ovens too soon after application.

The use of penetrating oils or sealers underneath finishes improves moderately—but only moderately—the resistance to surface water damage. On solid maple the improvement is negligible. On walnut and mahogany veneers however it is measurable.

Special adhesive sealers are now available which if used directly on the wood improves resistance to water damage on all woods. They do not prevent water penetration, but retain high adhesion, thus minimizing separation of the film around the area of swelling or cracking. Waxing improves the resistance of nearly any finish to damage by surface water.

Alcohol Resistance

Many ordinary coatings take little or no damage even from pure alcohol spilled on the surface, if it evaporates quickly. But if covered with a glass or bottle and held wet under pressure, considerable damage may be expected. Under this same condition, the softening action of beverage alcohol—as 100 proof whisky—is much less severe than pure alcohol.

Best alcohol resisting lacquers take permanent printing damage, but no whitening or lifting, from pure alcohol held wet under pressure overnight. With straight whisky the damage is negligible, may usually be polished out (unless contact pressure is considerable).

Good urea synthetics take only slight pressure damage from pure alcohol, may usually be rubbed out. Straight

whisky causes only a faint ring, easily rubbed out.

With either type, heavy coatings show deeper printing damage than moderate coatings. On the other hand, very thin coatings may permit wood grain lifting by water penetration from water-alcohol mixtures.

Alcohol resistance of all coatings increases with age until the film reaches maximum hardness. Baked coatings test better than air dried coatings. Testing should not be done on fresh coatings.

Coatings immune to damage even by pure alcohol are available. They are not practical for general use on wood due to lack of elasticity or to poor color stability.

Resistance to Nail Polish and Remover, Perfumes, Etc.

The better urea synthetics and the rarely used phenolic synthetics are not damaged by spillage of nail polish or remover. If nail polish is spilled on these surfaces and allowed to dry it may be cleaned off with remover without damage.

All nitrocellulose base lacquers and oleo resinous varnishes are damaged by nail polishes or removers. These materials contain ester and ketone solvents which are solvents for nitrocellulose and which soften and swell dried varnish films.

Perfumes also contain essential oils which are powerful solvents for lacquers and softeners for varnishes. The effects are highly variable but some damage may be expected. Urea synthetics in general are more resistant to damage by perfumes than lacquers or varnishes.

Fear less, hope more; eat less, chew more; whine less, breathe more; talk less, say more; hate less, love more; and all good things will be yours.

—Swedish Proverb

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Keep the EDGES SHARP

PROPERLY sharpened chisel edges slice cleanly through wood fibers leaving sheared surfaces that require a minimum of supplementary sanding prior to painting or varnishing. The degree of accuracy in cutting wood to prescribed limits with chisel type tools (hand chisels, lathe tools, plane irons, etc.) and the ease with which the tools are passed through the wood are directly proportional to the sharpness of the cutting edge.

In contrast, an improperly sharpened chisel edge tears through wood fibers leaving the ragged edges of splintered grain and other surface flaws that can be removed only with a great deal of surface sanding. Also the path a dull chisel will follow through wood cannot be accurately predicted, and the force required is always excessive.

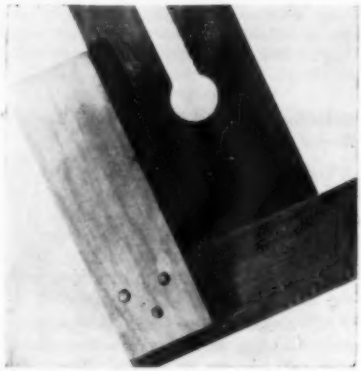
Sharpening A Wood Chisel

By following the five simple steps of tool sharpening, keen cutting edges can be produced on chisel type tools by any craftsman regardless of his shop facilities. Recommended by the grinding and polishing engineers of Behr-Manning Corporation of Troy, N. Y., this procedure is a simplification of the sharpening methods used by experts. Material requirements include a coarse flat sharpening stone and a fine flat sharpening stone or a single combination type stone (Crystoline combination or India combination), and a light free-flowing oil.

If the tool's cutting edge is deeply nicked, prepare it for sharpening by grinding out the nick with a bench grinder. Use a belt grinder if one is available because belts grind cooler than grinding wheels, and also produce a flat surface that can be easily honed.

1. Square Edge

The cutting edge of a wood chisel must be square with the side of the chisel, particularly if it is the cutting element of a bench or block plane. This squareness can be checked with a small tri-square. If the blade is not square, polish the high corner of the cutting edge by holding the blade vertically on the face of the coarse stone and move across the long axis of the stone. Do not change the vertical position of the chisel and bear down hardest on the side of the blade from which metal must be removed. Keep a liberal quantity of oil on the stone. Check the squareness of the chisel periodically and remove metal as required until the edge is flat and square with the side.



Check squareness of a chisel edge with a small tri-square. This check is particularly important in sharpening plane irons and other chisel type blades mounted in holders.

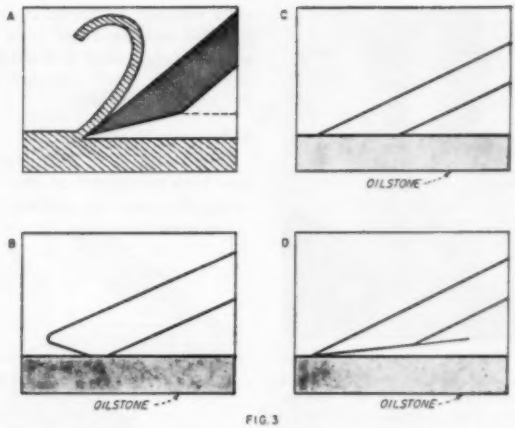


FIG. 3

Chip of wood turned up by properly sharpened chisel in view A curls on leading face of chisel. Note that heel of chisel clears wood.
To restore proper bevel angle to dulled chisel in view B, use coarse oil stone and hold chisel at proper angle.
Bevel angle stoning completed, view C, the beveled surface should rest flatly on the stone with blade inclined at a 25° to 30° angle.
In use, blade inclination will be slightly greater than 30° insuring clearance between heel of blade and work.

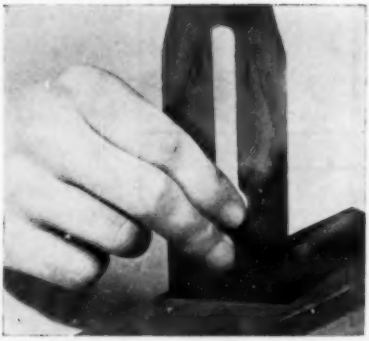
2. Hone Front Face

Hold the blade flat face down against the fine side of the sharpening stone and move it across the sharpening stone with long oval movements. Maintain equal pressure across the entire face of the blade and keep the stone oiled. This operation will remove work-worn grooves from the top face of the plane. If not polished out, each groove on the blade face will cause a corresponding dip in the cutting edge, where the bevel and the face meet. Without removing these marks, a fine cutting edge will be impossible to obtain.

3. Hone Bevel

To stone the bevel of a plane iron or a chisel, hold the wrist rigid and move the blade across the stone in a continuous figure eight pattern. Hold the chisel iron in both hands, one hand to control the bevel angle, and the other hand supplying the uniform downward pressure on the stone. Movement of the chisel across the stone should be supplied by a "swinging motion on the upper arms."

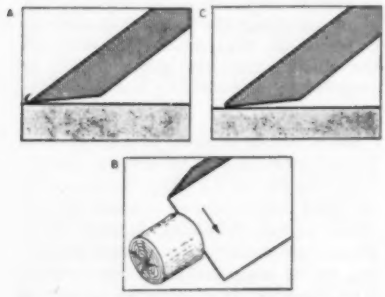
Bevel angles of hand held chisel type tools (socket chisels, lathe tools, gouges, etc.) should be 25°-30°. Bevel angles of fixed blade chisels (bench planes, block planes, trimming knives, spoke shaves, etc.) should be ground according to the manufacturer's instructions. One manufacturer, Stanley Tools of New Britain, Conn., recommends a 25° to 30° angle for all its bench type planes. This company also supplies a 25° gauge for checking the bevel angle of plane irons. If a protractor is not available



To square the cutting edge of a chisel type tool, hold the blade vertically and pass across the coarse side of the sharpening stone. Concentrate downward pressure on high side of blade.

for measuring the bevel angle, the angle can be estimated by scale measurement. The bevel of 25°-30° angle blade should be a little longer than two times the thickness of the blade.

The bevel angle of a chisel blade should be slightly smaller than necessary to clear the work. However, a bevel angle too small leaves the cutting edge without sufficient metal to support it. The cutting edge of a chisel with a bevel angle that is too large will not contact the work because the heel of the chisel interferes.



Wire edge, a burr on the chisel cutting edge (view A), develops when bevel is stoned. To remove wire edge, slice the cutting edge across a piece of hard wood. Wire edge removed, a microscopic radius (view B) gives strength to cutting edge.

4. Remove Wire Edge

Wire edge is a term applied to the fine burr produced on the cutting edge when the bevel is polished or ground.

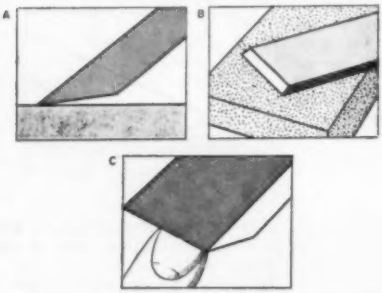


FIG.5

Edge bevel is a secondary flat surface at the cutting edge on the beveled end of the chisel. Using a light pressure, stroke the chisel across a fine stone in a figure eight movement, holding blade at an angle as shown in view A. Hone the front face by moving chisel across fine stone (view B) covered with light grade oil. Sharpness of chisel can be checked by resting it on a fingernail (view C). A properly sharpened chisel will not glide across nail.

If the wire edge is not removed, it will interfere with the initial cutting action of the blade. Also it will soon break off and will leave an uneven and broken cutting edge on the tool. To remove this wire edge without damaging the blade, slice the chisel across a piece of hardwood two or three times. This action will evenly peel the wire edge off the blade and leave a smooth cutting surface.

5. Stone Edge Bevel

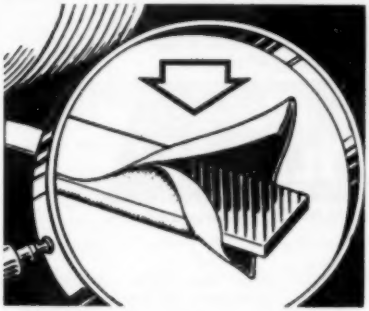
Hold the bevel of the chisel blade flat against a fine polishing stone. Then

raise the heel of it slightly and, holding the blade rigidly, move it across the stone with a figure eight movement. Use very little pressure and keep the face of the stone covered with oil. Two or three times during this procedure, turn the blade over and lightly stone the flat face.

To test the sharpness of the edge, rest it at an angle on the thumbnail If it slides across the nail, the blade has not yet reached its greatest degree of sharpness.

FIBER-STEEL STRAPPING

Fiber and steel strapping consists of a steel core—strong processed steel strapping sheathed in a protective cover of heavy Kraft paper with a smooth, water repellant wax finish. By a special process this cover is sealed to the core to make an integral strapping with a tensile strength comparable to the standard steel strapping and effective under all temperature and humidity conditions. It will not leave adhesive stains.



The paper cover can be marked with a pencil or stamped in any way desired. The sheathed edge of the steel band eliminates the danger of cuts to the operator.

Fiber-and-steel, available from A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill., is applied with regular steel binder tools. This strapping can be applied directly to cabinets or furniture without danger of marring or marking in any way.

BELT SHAPESANDER

The Model B belt Shapsander will sand wood stock of straight, curved and serpentine shapes in various thicknesses. The feed roll operates on a pivot action and can easily accommodate all types of stock with a stock thickness tolerance of 1½" variance over lengths of 18". Sanding is smooth and ripple free producing top quality finishes.

Sanding operations on straight wood stock is an especially outstanding fac-

tor on the new Timesaver Shapesander and plywood panels can be handled even though not absolutely flat without danger of sanding through the face.

Paper or cloth abrasive belts can be used on the Model B belt Shapesander with equal success. Belts can be quickly changed limiting down time of machine to 3 or 4 minutes. A minimum of adjustment is required for the belt tracks and movement is perfectly maintained through all types of sanding operations, it is claimed.

For further information write direct to Timesavers, Inc., P.O. Box L, Robbinsdale, Minnesota.

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Side view shows molded-in grooves in sides of frame provide ample clearance for spectacle temples — removes interference with eye glass comfort.

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The book is priced at $1.75. Quantity prices may be obtained by writing the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

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surfaces as the single deck types. The smoothest finish is obtained with belt sanders. The actual grades required for either type of machines will vary with the type and species of plywood, and with the degree of smoothness required. No general recommendations are offered, and there may be several alternate combinations which will produce the quality desired.

The backing on which grits are mounted is important, and may be of paper, cloth or combinations of the two. Special reinforced backings are available, but all backings must have maximum flexibility.

Conclusions

The wide range of sanding equipment available requires not only careful selection in initial purchases, but it also demands skill and experience in choosing the right grades of sandpaper and in maintaining the equipment in the best operating condition.

Space has only permitted brief descriptions of the principal types of sander equipment. Interested readers are therefore referred to the following equipment manufacturers for further details. These companies have been helpful in supplying data and photographs for this article.

Belt and Stroke Sanders:

Beach Manufacturing Company, Montrose, Pennsylvania. Curtis Machine Works, Jamestown, New York. Mattison Machine Works, Rockford, Illinois. Oakley Company, Bristol, Tennessee. Oliver Machinery Company, Grand Rapids, Michigan. Wysong & Miles Company, Greensboro, North Carolina.

Drum Sanders, Single and Double:

Beach Manufacturing Company, Montrose, Pennsylvania. Sheboygan Machine Company, Sheboygan, Wisconsin. H. B. Smith Machine Company,

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Good Housekeeping
IN FURNITURE PLANTS

By Lawrence E. Eisele

This article was first presented at the 1953 National Safety Congress and is reprinted with permission.

UNDER what conditions do we want to spend those hours that are spent at work? How do we want to keep the area in which we earn our living? If it is to be more like our homes, orderly and clean, we certainly can spend those hours, even though they are working hours, in an enjoyable place where we are safe and happy. We want to talk about good housekeeping in woodworking and furniture plants.

What Is Good Housekeeping?

In the first place, "What is good housekeeping?" We all have janitors, supposedly enough in each department or division to keep the plant orderly and free of refuse and dirt. However, good housekeeping goes a little further than that. I think we can agree that good housekeeping means keeping your department in a clean, workable order that is conducive to favorable working conditions, good production, and high employee moral—coupled with safety! Is it enough to think that the janitor will do all this for us? Can we rely on his daily routine to keep our departments and divisions in such good order? Perhaps you have found such janitors in your shop, but we have certainly been unable to find such competent men in ours. We have determined that it is a departmental job as well as an individual worker's job, or part of his job, to recognize good housekeeping. We at Kroehler Manufacturing Company, are interested in good housekeeping from the president of the company on down to the worker. As part of our company policy, housekeeping is given an important place in the workings of our organization.

Regular inspection trips by authorized personnel through the entire plant, with written reports on the observations made, and recommendations for improvements, are given to the works manager at regular intervals. These aid him in following up on lax housekeeping in any part of his line organi-

zation. This subject is not new to us. We have been living with it ever since our plant was established, sixty years ago. It is certainly one of those things that you can never do without! Something you must live with! Since we recognize that we have to get along with this good housekeeping business, we might as well make it as easy as possible on ourselves. Therefore, we have set up a weekly foreman's inspection report that is sent to the works manager, designating certain things that the foremen believe should be done in their departments to keep them in good order. Such reports are reviewed, and the suggested conditions are corrected; or the foreman is given an answer as to why such work should not, or will not, be done. In this way we feel the foreman will certainly go over his department before making out such a report.

He certainly will not say that the windows are all in good repair when three or four of them are broken. The assistant works manager goes through the plant at least once a week on a general tour and makes notes of areas that he feels are not up to housekeeping par. Reports and inspection generally keep our foremen on their toes in regard to housekeeping. We have a form we use for this foreman's weekly report.

This sounds as if we possibly have everything under control—with no problems; but we're all human and once in a while we'll get a report from the works manager that might say, "We're slipping on Housekeeping." This did happen. We decided some type of drastic action would have to be taken, but on the other hand we felt perhaps, some type of a contest might be more in order, something to stimulate foremen, something to give them a little more interest in this dull job of constant housekeeping.

Contest Brings Results

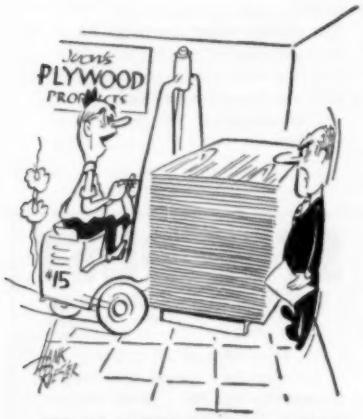
So we did set up a contest for them, based on a merit system for good housekeeping, with 100 as perfect score. The duration of the contest was eight weeks. The three top scoring departments were given prizes for their efforts. At one of our weekly meetings with the foremen, it was explained that a housekeeping inspection would be made weekly by a member of the management group. This could be one of the superintendents, an inspector, personnel supervisor, assistant works manager, or possibly one of the engineers. A new form would be devised for each department with certain items listed and merit points established for such items. As an example, No. 1 might be: "Is the department clean of obsolete material, milk bottles, coke bottles, spoiled material, and so forth?" We might give that particular item a value of six.

The second might be: "Are aisles clearly marked?" Another might be "Are materials and supplies stored neatly?", and another "Are window sills clean?, Are all windows intact?, Is the desk and office clean and in order?"

Each one of these items would be given a certain value up to 100, the perfect score. The foreman would be asked to go through his department with the inspector so these conditions could be pointed out and corrected. The foreman had already sent in a weekly housekeeping report. If he had noted, shall we say, that he had one or two broken windows and we also found it on the inspection, he would be given credit for that point because we assume that the maintenance department had not had time to correct the condition. When put into effect this inspection certainly created a lot of interest. Since we were having foreman's meetings weekly, we reviewed the reports made of the inspection, as well as the reason why totals were changed according to

the housekeeping report that was sent in by the foreman weekly. This created rivalry between the departments and produced the results which we were looking for. The interest in this contest permeated down to the employees through the foreman's efforts. I would say everyone became "housekeeping conscious" during those eight weeks. We prepared a record of weekly results. We had it ready for the weekly meetings. At that time every foreman could see just where he stood in the contest.

After the contest was over, you might wonder what was gained by this housekeeping inspection system. We found that there was better cooperation between worker and management. Certainly, better working conditions resulted. A safer place to work was naturally the result because certain unsafe conditions were corrected. There was more working area available because obsolete equipment was not stored in the working areas. All employees and management experienced an all-around feeling of self-satisfaction and pride in a good-looking department. Our housekeeping inspection report is different for nearly every department.



"Maybe I should try some other line of work."

Housekeeping Record 1.

	Value
1. Is department free of milk bottles; coke bottles; garbage; spoiled material and obsolete material	5
2. Are aisles clearly marked	9
3. Are materials and supplies behind white lines	15
4. Are materials and supplies stored neatly	21
5. Are all posts clean and nothing hanging on them .	5
6. Are all window sills clean	5
7. Are all windows unbroken	5
8. Is desk and office clean and tidy	5
9. Is machinery and equipment in good repair	18
10. Is yard free of weeds	12
100—( ) equals....Score	

Housekeeping Record 2.

	Value
1. Is department free of milk bottles; coke bottles; garbage; spoiled material and obsolete material	7
2. Are materials and supplies stored neatly	15
3. Are posts clean and nothing hanging on them	12
4. Are beams and light shades dusted	9
5. Are your rest rooms clean and orderly (clean, painted, no broken windows or equipment)	7
6. Are window sills clean ..	7
7. Are windows unbroken ..	5
8. Is drinking fountain area clean	5
9. Is all your machinery and equipment in good repair	13
10. Is department free of all obsolete machinery and equipment	10

11. Is desk clean and orderly 5
12. Is area back of fire door clean and free from foreign matter 5

100—( ) equals....Score

Housekeeping Record 3.

	Value
1. Is department free of milk bottles; coke bottles; garbage; spoiled material and obsolete material	7
2. Are materials and supplies stored neatly	12
3. Are work benches clean and orderly	12
4. Are posts clean and nothing hanging on them	7
5. Are beams and light shades dusted	7
6. Is your fountain area clean	5
7. Is desk and office clean and tidy	7
8. Are machinery and equipment in good repair	15
9. Is department free of all obsolete machinery and equipment	7
10. Is your basement storage area clean and orderly ...	16
11. Is area back of fire door clean and free from foreign matter and are all trucks and material out of fire door opening	5

100—( ) equals....Score

Housekeeping Record 4.

	Value
1. Is department free of milk bottles; coke bottles; garbage; spoiled material and obsolete material	7
2. Are aisles clearly marked	5
3. Are materials and supplies stored neatly	10
4. Are materials and supplies behind white lines	5
5. Are work benches clean and orderly	5
6. Are posts clean and nothing hanging on them	5
7. Are beams and light shades dusted	5
8. Are rest rooms clean and orderly (clean, painted, no broken windows or equipment)	5
9. Are window sills clean ..	5
10. Are windows unbroken ..	3
11. Is drinking fountain area clean	5
12. Is machinery and equipment in good repair and painted	5
13. Are trucks straight and behind white lines or in designated areas	5
14. Is department free of obsolete machinery and equipment	5
15. Is desk and office clean and orderly	5
16. Is area back of the fire door clean and free from foreign matter and are all trucks and material out out of fire door openings	10
17. Are aisles open to all hose and fire extinguisher areas	5
18. **Cotton Department Only** —Has elevator pit been cleaned	5

100—( ) equals....Score

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Foreman's Good Housekeeping Check Sheet

	Yes	No
1. Are all floors clean first thing in the morning?	....	....
2. Are your floors kept clean during the day?	....	....
3. Are your aisles clearly marked?	....	....
4. Are all materials and supplies behind white lines?	....	....
5. Are your materials and supplies neatly stored?	....	....
6. Are all work benches clean and orderly?	....	....
7. Are all your posts clean and painted?	....	....
8. Are all beams and light shades dusted regularly?	....	....
9. Are your rest rooms clean and orderly (clean, painted, no broken windows or other equipment) ?	....	....
10. Are all your windows clean and unbroken?	....	....
11. Are all your windows sills clean?	....	....
12. Is drinking fountain area kept clean and painted?	....	....
13. Do you constantly stress the importance of good housekeeping to your employees?	....	....
14. Is your desk or office clean and tidy?	....	....
15. Are your employees' jackets and coats hung where they belong?	....	....
16. Are the trucks in your department in good shape?	....	....
17. Is all your machinery and equipment in good repair and properly painted?	....	....

Comments and Suggestions

Date____ Dept____ Foreman____

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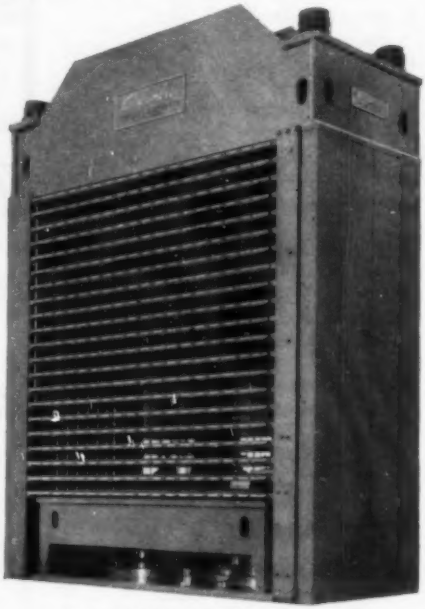

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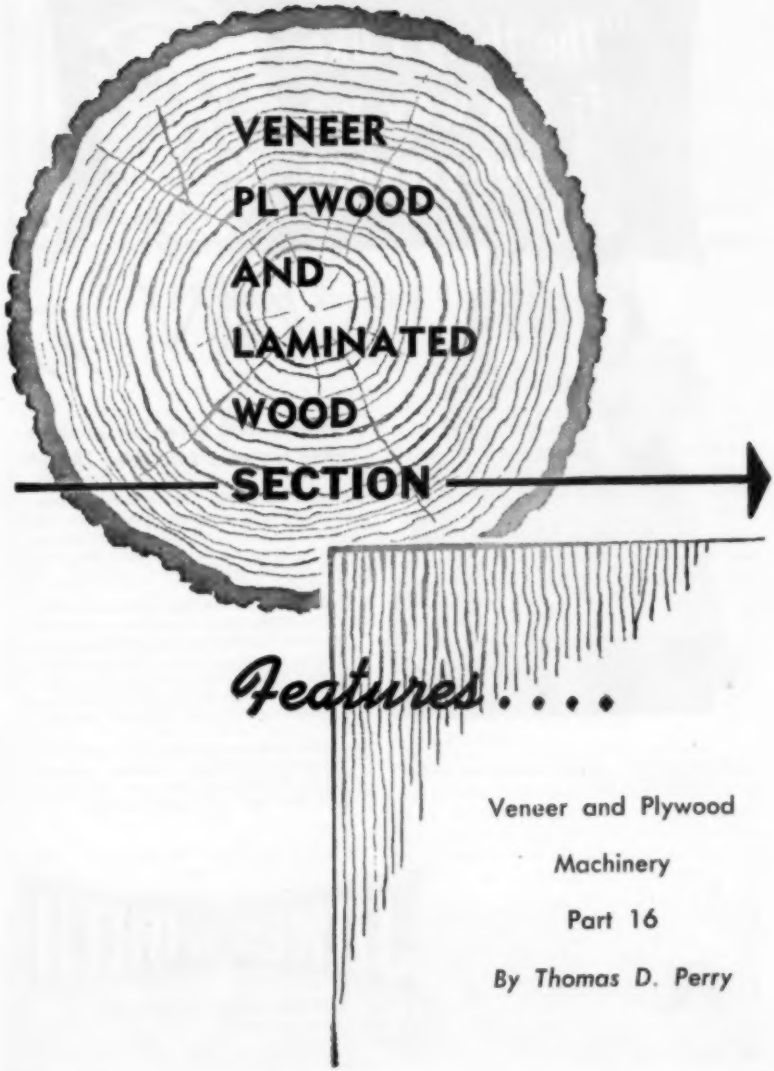

Veneer and Plywood

Machinery

Part 16

By Thomas D. Perry

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VENEER and PLYWOOD MACHINERY

Part 16

Plywood Sanding Equipment

By Thomas D. Perry

THE sanding operation is the final step in the many processes of making plywood, as they have been described in this series of articles on veneer and plywood machinery. There are many types of sanders, designed for a variety of smoothing problems. Some are suitable for flat surfaces on solid wood or plywood, while others are especially adapted to sanding ends, edges and a variety of curved surfaces, such as lathe, molder and shaper products; special devices are also available for sanding partially and completely assembled products. In sanding solid wood the function of a sander is to remove the tool marks, both on side and end wood, including any tearouts that may have occurred on end wood or on rounded corners.

The functions of sanding plywood are somewhat different from those of smoothing solid wood, since tool marks are seldom present. Plywood sanding involves the transforming of the relatively flat outer areas of the glued, patched and trimmed plywood into polished surfaces that are suitable for the application of finish coatings, which either will reveal attractive grain figure, or serve as a suitable base for uniformly pigmented surfaces. This is the ultimate in sanding and applies to custom made plywood for furniture, cabinets, pianos, and the like. In the case of stock panels, doors and other stock items of plywood, which are subject to shipping or warehousing "in the white," the sanding should stop one step short of this final polishing. It must, however, provide a reasonably smooth surface that will allow careful inspection, and will require only a minimum of polish sanding just prior to the applications of finish coatings.

Classification

It will be the purpose of this article to include only such sanding equipment as is adapted to plywood requirements. Sanders for plywood can be divided into two major classes: belt sanders, where the sanding pressure and the movement of the plywood are under the manual control of the operator; and drum sanders, with mechanical feeds and automatic pressures, for each of which adequate regulation is provided.

The belt sanders, including the automatic stroke types, are especially adapted to final polishing operations,

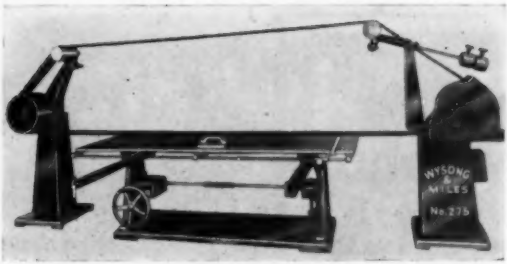

Fig. 1. Wysong & Miles belt sander, overslung.

as well as to rough and final sanding on thin figured face veneers.

The drum sanders, usually with several drums, find their most efficient use in sanding stock panels on one or two sides, usually allowing for a final polish sanding on belt sanders. These drum sanders are faster, as they sand the entire width simultaneously, and are powerful enough for such heavy cuts as are often required on relatively rough cut Douglas fir plywood.

Belt Sanders

Belt sanders are adapted to lighter sanding than the drum sanders, and the plywood surface is observable at all times, so that the operator can guard against sanding through thin veneers. They are particularly useful in the final polishing just before applying finishes. Many manufacturers of plywood, in custom made sizes, with 1/28" face veneers, prefer belt sanders for all sanding on such stock, especially with highly figured face veneers, where the extent of sanding requirements may vary from panel to panel, according to the character of the veneer. While belt sanders may take a little longer for the two steps of rough and polish sanding with the finer grades of sandpaper customarily used on this equipment, it is often the more economical procedure for plywood in the higher cost ranges. Alternately the plywood may be belt sanded first with coarse grits and secondly with fine grits, but this requires two handlings, with attendant time and cost factors. Some belt sanders are provided with double (parallel) belts, one for rough and one for fine paper, which will eliminate this double handling.

The sander belts are continuous, the ends being punched with interlocking contours and the joints are often reinforced with gummed tape, to prevent the extensions from slipping out of place.

Belt sanders run the gamut, from the simpler types that have only a hand

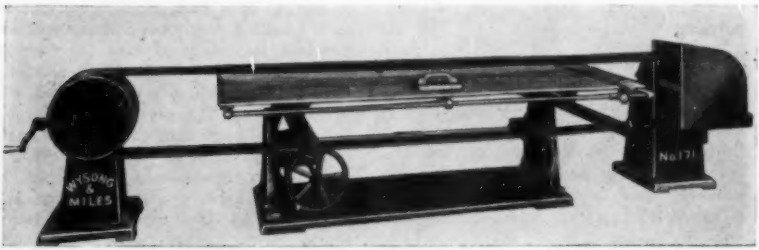

Fig. 2. Wysong & Miles belt sander, underslung.

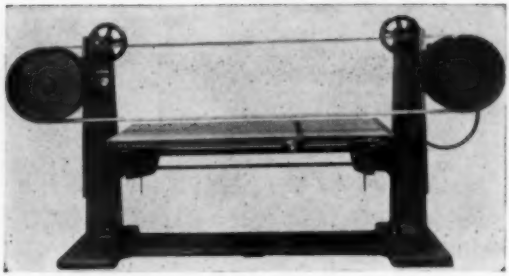

Fig. 3. Oliver belt sander, overslung

pad and sandpaper belt, through those in which the pad, or foot, is suspended and runs freely on ways, under the lever control of the operator, to the automatic stroke type, where the suspended pad is moved back and forth automatically on ways, but under the pressure control of the operator. The hand pad is better adapted to short runs of miscellaneous sizes, while the suspended pad is easier on the workman for long runs and larger sizes of plywood. In all cases, the plywood on the machine table moves in and out (across the grain) at the operator's discretion.

Hand Pad Types of Belt Sanders

A basic type of belt sander, with hand pad, is illustrated in Fig. 1, in which the belt standards and table are independent, the overhead belt is provided with a balanced tightener, and the cutting is done by the lower belt.

A similar type of belt sander with the upper belt cutting, is shown in Fig. 2. In this case the sandpaper cutting surface rests against the pulleys and the return belt is below the table. This has desirable safety features.

Another equipment manufacturer offers types of belt sanders in which the table is integral with the end standards, as is shown in Fig. 3, where the cutting is done by the lower belt and the smooth side of the paper is against the pulleys.

A smaller and simpler integral type is illustrated in Fig. 4, where the upper belt does the cutting and the return belt is below the table, as an added safety feature.

A larger model is pictured in Fig. 5, with an independent work table, up to 96" long. The cutting is by the upper belt with the abrasive side of the belt against the pulleys.

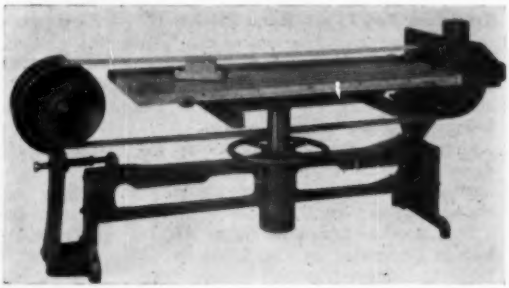

Fig. 4. Oliver belt sander underslung, small size.

Fig. 5. Oliver belt sander, underslung, large size.

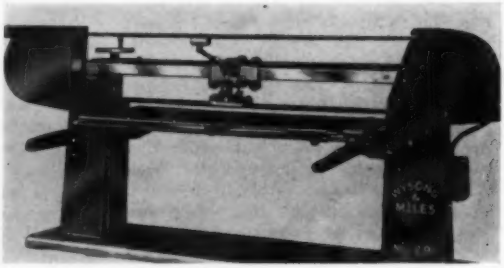

Fig. 6. Wysong & Miles belt sander with traveling pad.

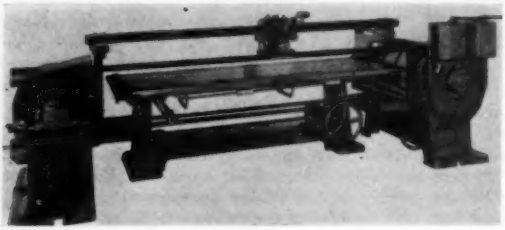

Fig. 7. Wysong & Miles double belt sander with traveling pad.

Traveling Pad Types, Hand Stroke

This type has the sanding pad mounted on horizontal ways, the in and out movement of the table and the vertical pressure on the sanding pad being under the manual control of the operator. An example is shown in Fig. 6, with an integral table and lower cutting belt. The pressure handle is shown at front center.

Still another type with upper cutting belt is illustrated in Fig. 7, where the table is independent and double (parallel) sander belts are provided, which may be equipped with different grades of sandpaper. The traveling pad has in and out adjustments so that it can be applied to either belt.

Another manufacturer offers similar equipment, as is illustrated in Fig. 8. Here the table is independent and the cutting is by the lower belt. In this photograph a long pad is in use, which indicates the use of a fine grade of abrasives for final polishing.

This type is also supplied with a

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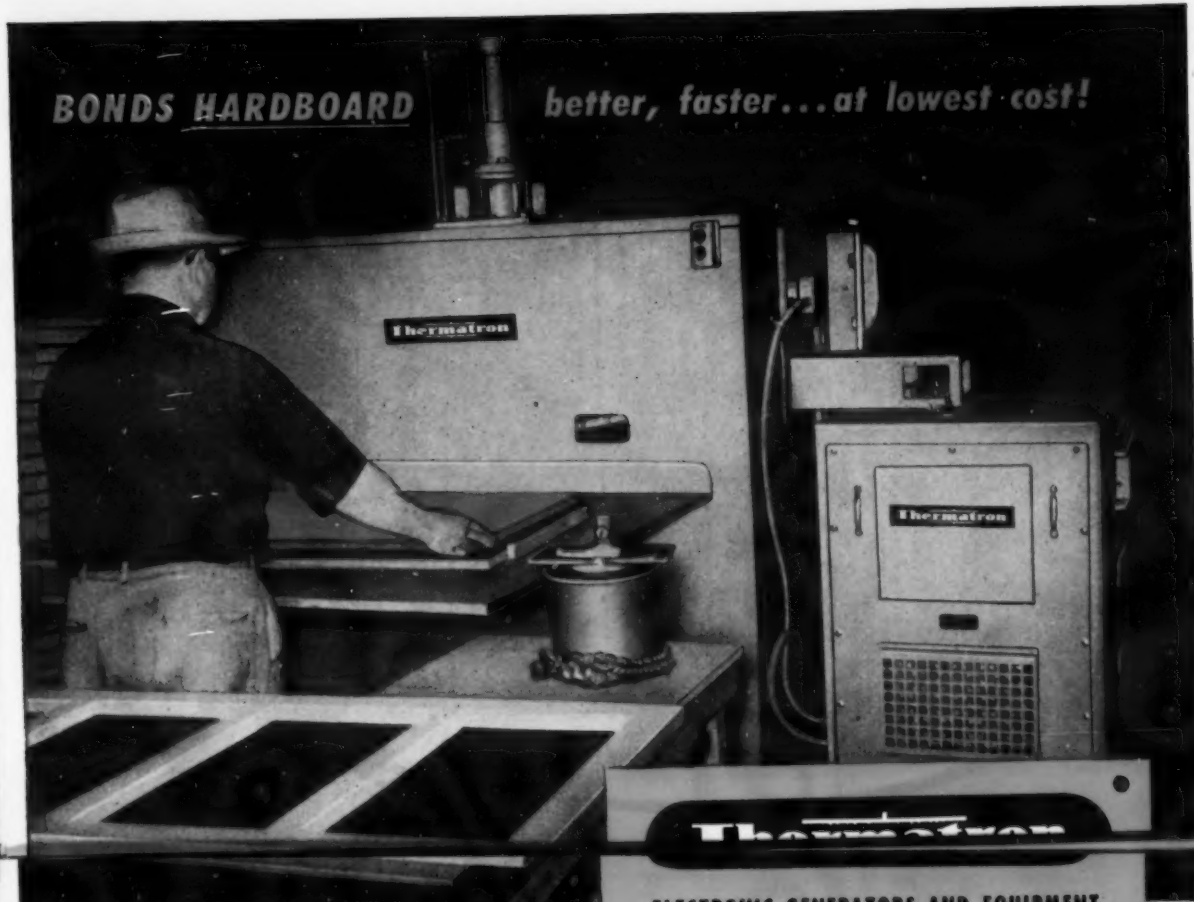
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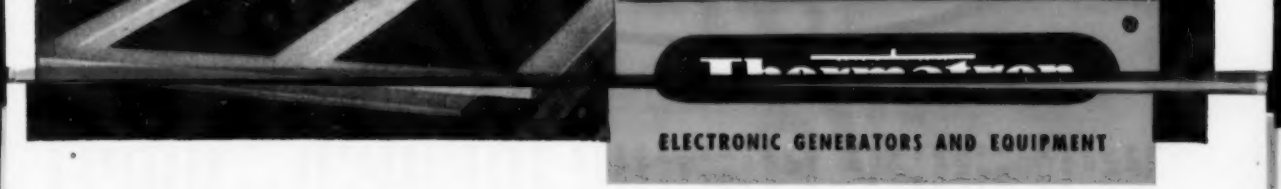

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Fig. 8. Oliver belt sander with traveling pad.

reversible motor, as is shown in Fig. 9. This photograph gives a "close-up" of a smaller traveling sander pad.

A third design of traveling pad sander, manually operated, is shown in Fig. 10, with cutting done by the lower belt. The table is integral with the standards.

Traveling Pad Types, Automatic Stroke

In these types the traveling pad is automatically reciprocated, back and forth, over the entire length of the plywood. An example is shown in Fig. 11. Here the pressure lever on the sanding pad is central and the stroke of the pad is adjustable according to the size of the plywood.

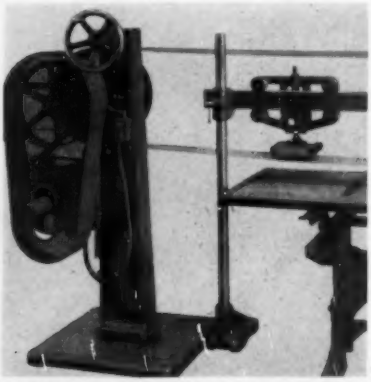

Fig. 9. Oliver reversible belt sander with traveling pad.

Another manufacturer provides a comparable type of equipment, which is illustrated in Fig. 12, except that this is provided with double sander belts, permitting the use of two grades of sandpaper. The stroke of the pad is hydraulically controlled and requires higher hydraulic pressures for the longer stroke ranges.

Still a third example of the automatic stroke sander is shown in Fig. 13. This also is equipped with a hydraulic stroke mechanism. The table is integral with the framer, the stroke is adjustable for length and the pad is of a free floating type to equalize sanding pressures. This machine can be provided with single or double sander belts, permitting the use of two grades of sandpaper by shifting the location of the traveling ways that carry the sanding pad.

A comparison of the output of sanders having manually operated pads, shown in Fig. 10, with the automatic stroke equipment shown in Fig. 13, running at 110 strokes per minute on 96" plywood, indicates that the automatic machine will turn out two to three times the footage that can be obtained from the manually operated pad type. This practically offsets the higher cost of the automatic machine, which is particularly adapted to large volume plywood production.

Drum Sanders

In a drum sander the abrasive paper is wrapped around a cylinder by means of an internal tension clamp. Some type of felt blanket is interposed between the metal cylinder and the sandpaper, to provide a yielding cushion, so that the abrasive grits are automatically

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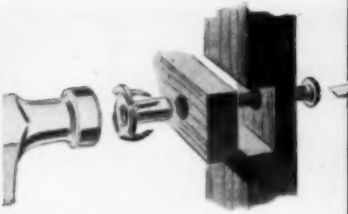

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Fig. 10. Curtis belt sander with traveling pad.

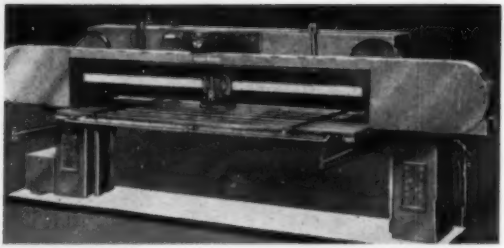

Fig. 11. Wysong & Miles automatic stroke belt sander.

Fig. 12. Mattison automatic stroke double belt sander.

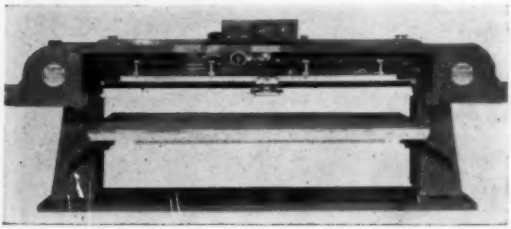

Fig. 13. Curtis automatic stroke double belt sander.

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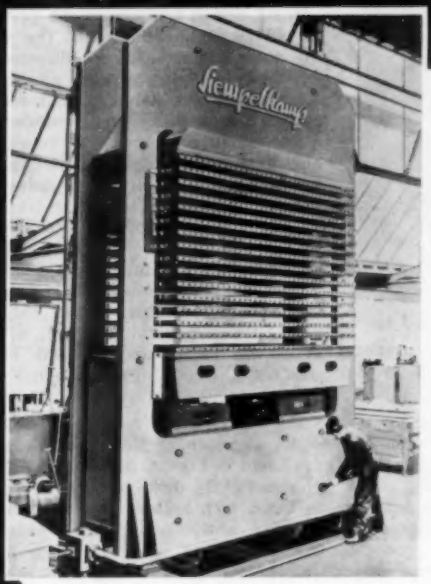

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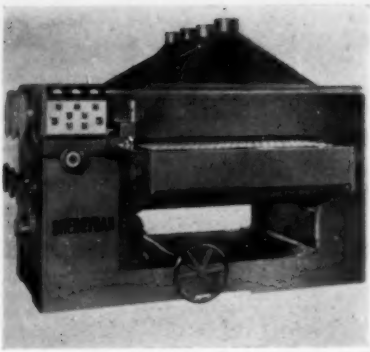

Fig. 14. Sheboygan endless bed sander, 3-drum single.

pressed against the wood surfaces. This pressure is adjustable according to the density of the species and the depth of cut desired. The R.P.M. of the sanding cylinders is usually constant, while that of the feeding mechanism can be regulated over a considerable range.

Drum sanders are of two general types: single, sanding either one side; or double, sanding both sides of the plywood. There may be two, three or four sanding rolls in each tier. Most single sanders have the sanding rollers above a feed belt, which is equipped with rubber pads to grip and feed the plywood forward under the sanding rolls. Some single sanders have the sander drums below the plywood, in which case steel pressure rolls are located below and above the plywood for advancing the plywood. The sanding rolls run against the direction of the feed. In double sanders these steel feed rollers are standard, and are located on each side of every sander roll.

The sanding rolls not only rotate, but also have a lengthwise oscillating motion of approximately ¼", to reduce the hazard of straight scratch marks and to provide more perfect surfaces on the plywood.

Some of the manufacturers of sanding equipment make both single and double sanders, while others make only the single types. Several examples of each type will be illustrated and briefly described.

Single Deck Sanders

An example of this type of sander is shown in Fig. 14, fully equipped with the customary dust hoods. The feed belt is faced with hollow squares of rubber to give a suction effect. Widths are standard at 43" and 49"; feeds are 12 to 24 f.p.m.; oscillating movement is 5/16" at the rate of 190 per minute; first and second drums run at 1,200 r.p.m., while the third turns at 1,800 r.p.m. Each drum is provided with a clamp and tightener to take up all slack in the abrasive paper.

The single surface sander illustrated in Fig. 15 is designed for heavy duty and differs from the others described

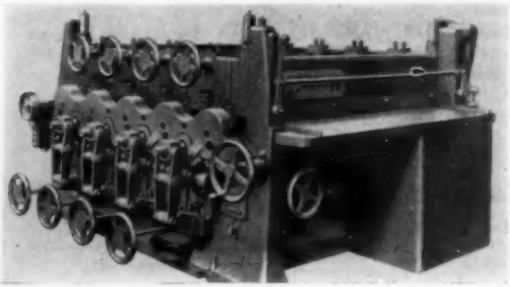

Fig. 15. Yates-American roll feed sander, 4-drum single.

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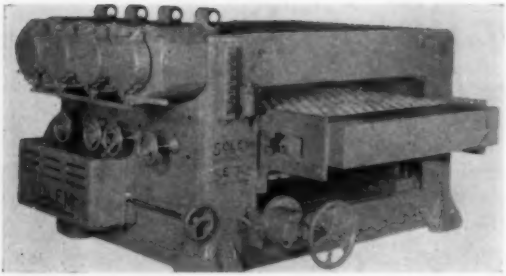

Fig. 16. Solem endless bed sander, 4-drum single.

in having roller rather than endless bed feeding devices. The sander rollers are below the table, and the lower feed rollers are located on each side of each sander roller. There are additional spring weighted upper feed rollers above the plywood insuring a uniform rate of speed, which can be adjusted from 12 to 36 f.p.m. All sander drums are driven at 1,800 r.p.m. and are equipped either for spirally wound sandpaper or for straight square sheets. Available widths of the machines are 49", 55", 61", and 73". The oscillating mechanism has a ¼" stroke at the rate of 172 per minute. These oscillations are timed differently for each sander roll, insuring smoother surfaces on the plywood. This machine is also offered in the 3-drum type.

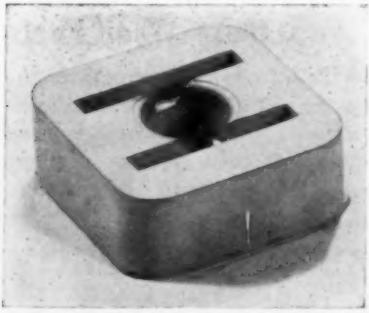

Fig. 17. Suction rubber cushion for Solem feed belt.

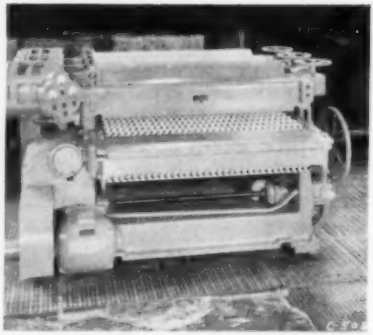

Fig. 18. Smith endless bed sander, 3-drum single.

Another make of single surface sander is shown in Fig. 16, which has an endless feed belt, in a range from 12 to 24 f.p.m. The rubber facing cushions are of a suction type, and are illustrated in Fig. 17. Widths available are, by 6" steps, from 31" to 85". Oscillations have a ¼" range at the rate of 230 per minute, and are operated by a right angle shaft and a cam device, rather than by linkage mechanisms. This higher rate of oscillation is claimed to provide maximum smoothness on the plywood. All sander rolls operate at 1,800 r.p.m. and will take either full spiral winding or slightly spiral shear cut, not parallel to the axis of the sander roll shaft. This requires

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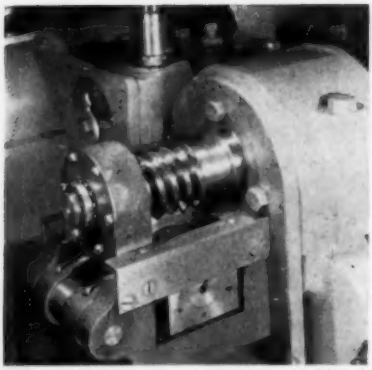

Fig. 19. Worm gear connection on Smith oscillator.

sandpaper sheets somewhat diamond shaped, and the effect is to ease the impact when the sandpaper hits the plywood over a straight clamping slot. This is more fully described in connection with Figs. 22 and 23.

A fourth type of endless bed sander is illustrated in Fig. 18, in which the conveyor belt is faced with detachable metal plates, each holding a group of oval cushion pads of rubber, both plates and cushions being replaceable for wear. The rate of feed is adjustable between 12 and 35 f.p.m. Standard widths are 31", 43", 49", 55" and 61". Drum speeds are 1,200 r.p.m. for the first and second sander drums and 1,800 r.p.m. for the third. The oscillating mechanism consists of a worm gear connection, as shown in Fig. 19, running in oil located on the end of the sander drum shaft. No oscillator is normally supplied on the first drum.

Double Deck Sanders

These are distinctly heavy duty machines, with two tiers of sanding rollers, capable of making heavy cuts on both sides of the plywood at one pass through the sander. They are standard equipment in most plywood plants making stock panels. Feeds are by two tiers of pressure rollers, with one pressure roller on each side of all sander rollers.

A typical example of this double sander is illustrated in Fig. 20, showing a front and left side view. The hoist for the top frame is motor driven and has a sufficient range to permit ready access to all sander drums for replacing sand paper. In general it is of a similar type to the single deck sander illustrated in Fig. 15, with an added tier of top sander rollers, including such auxiliary devices as are needed to handle the double tiers of sander rollers. Feed rates are from 12 to 36 f.p.m.; all drum speeds are 1,800 r.p.m., and the oscillators range is ¼" at 172 per minute, but the oscillations are timed differently on each sander roller. Standard widths are by 6" intervals from 49" to 73". Both spiral and straight

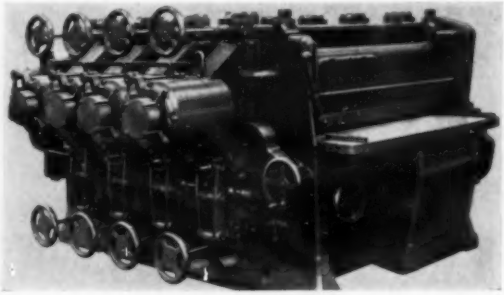

Fig. 20. Yates-American roll feed sander, 8-drum double.

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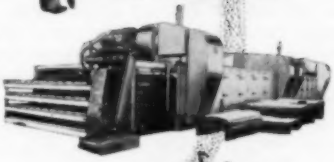

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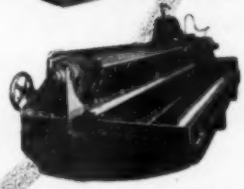

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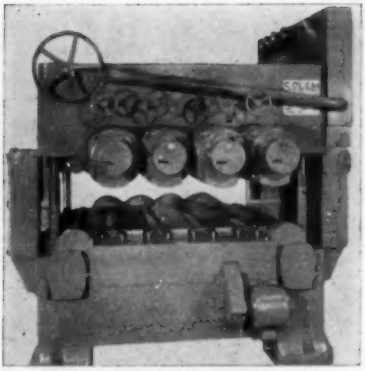

Fig. 21. Solem double deck sander, 8-drum double.

opening sander drums are available with automatic tension devices. This is also made in a 6-drum type.

Another make of double deck sanders is shown in Fig. 21, which is also equipped with pressure feed rollers on each side of all sander drums. Change gears can be provided for feed ratios of 17, 22, 30, 36, or 45 f.p.m.; drum speeds are 1,800 r.p.m.; oscillations are at the rate of 236 per minute over a range of ¼" under separate motor control, which also operates the feed rollers. Standard widths are, by 6" intervals, from 43" to 85".

The method of attaching sand paper to the drums on both single and double deck sanders differs somewhat among the different makers, each with claims for superiority.

An example is shown in Fig. 22, applying to Figs. 16 and 21, in which the motor extensions of the drum shafts happen to be reversed. Some of the other machine makers have a straight slot, in the lower photo, rather than the slight spiral arrangement.

The end clamping devices, applying to Figs. 16 and 21 are shown in detail in Fig. 23, indicating, in the upper photo, the metal end clamping straps, fixed at the top end and subject to tightening at the bottom end. The lower photo (Fig 22) shows a double clamp for both central ends of the sandpaper, with a cam operated lever for tightening. Similar clamping and tightening devices are on the opposite ends of both types of sander drums.

Sanding as a Method of Cutting

Sanding is a cutting operation, not by saw teeth or edged knives, but by small sharp abrasive particles mounted on a flexible paper or cloth backing. The size of these particles varies from fine to course, and their arrangement on the backing may be "close" or "open," the latter providing more room for the wood that is removed. This wood removed is in the form of stringy shavings or of small wood particles that are almost dust. As a matter of record, closed coating provides a relatively complete covering of the backing with abrasive grits, while open coating al-

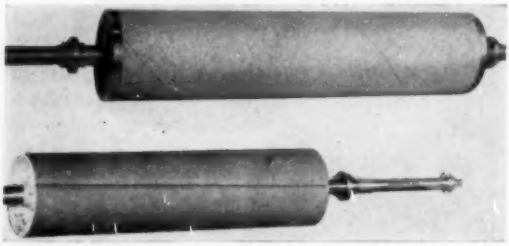

Fig. 22. Drum winding methods, Solem sanders. Upper: full spiral winding, edge clamp bands. Lower: slight spiral winding, clamps over center slot.

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lows 30% to 50% of uncovered area, although the abrasive is distributed in a uniform all-over pattern.

The sharpness of the abrasive particles varies according to the material from which they are made. The characteristics of the cutting qualities of these materials are summarized below:

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Silicon Carbide, a synthetic abrasive, very hard and used mostly on metals.

Flint, a flint quartz, used largely for hand sanding on wood.

Garnet, a natural abrasive, sharper than flint, used on wood.

Aluminum Oxide, a synthetic abrasive, not quite as sharp as silicon carbide, but tougher, and used extensively on mechanical sanders for wood.

The general rule for grades of sandpaper is to put the coarsest paper for the heaviest cuts on the first rollers of drum sanders, and to graduate to fine abrasive grits on the last sander rollers. Double deck sanders do not permit as accurate cutting or as smooth

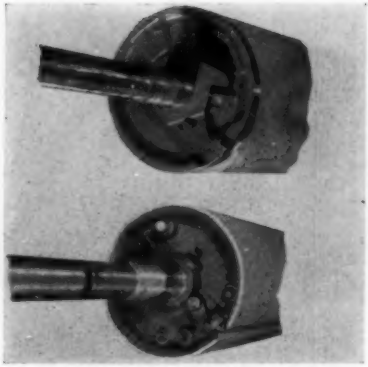
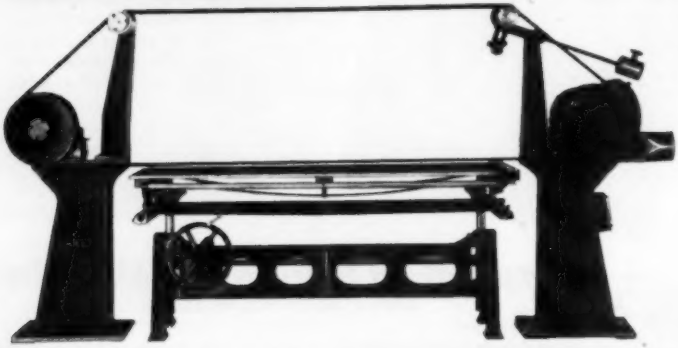


Fig. 23. Drum clamping devices, Solem sanders. Upper: full spiral winding, edge clamps only. Lower: slight spiral winding, center clamping.

The OAKLEY G-2 HANDBLOCK BELT SANDER



For flat sanding, molding sanding and a vast variety of irregular work, the Oakley G-2 provides the most economical and speedy answer. Low in price . . . high in quality, this overhead handblock belt sander incorporates every known detail for fast, low-cost production. Write today for information on this and other Oakley Sanders.

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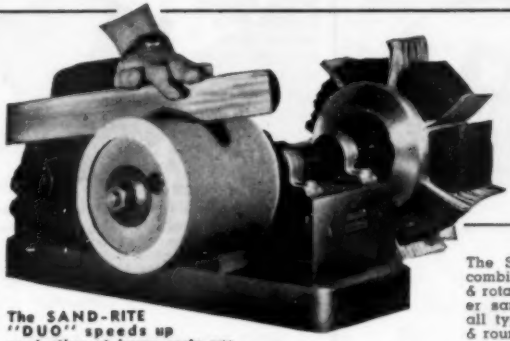

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AMERICAN WALNUT
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Simple, yet accurate and efficient.
Precision grinding of hard edge metal and wood cutting band and circular saws and hack saws.
Vise takes band saw blades ¼" to 6" wide, circular saw blades, 4" to 18" in diameter, hack saw blades ¼" and up.
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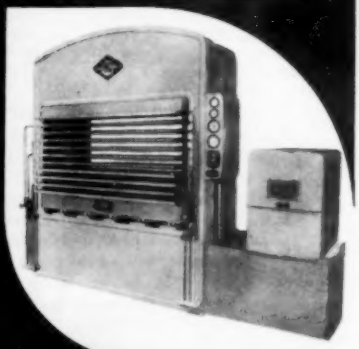
Satisfied customers is the reason for Fjellman & Winther Company's growing popularity . . . and why more and more manufacturers of laminates are turning to F.W. engineers with confidence and repeat orders.

The name Fjellman is recognized as being FIRST in design . . . FIRST in QUALITY . . . FIRST in EXPERIENCE!



Write for engineering data and our financing plan.
Write for our general catalog.

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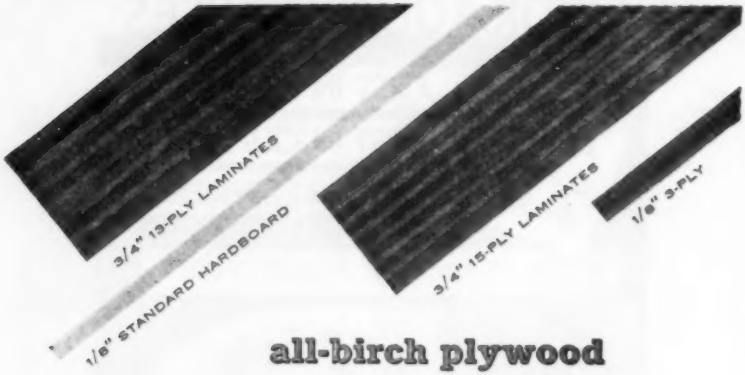
Impreg Gains Commercial Value

Recent success in the development and utilization of "impreg" a newcomer to the family of wood products, opens new vistas for the hardwood plywood industry and offers plywood producers an excellent opportunity to expand their services to other industries, according to R. D. Behm, director of trade promotion of the Hardwood Plywood Institute.

Impreg consists of wood impregnated with phenolic resin-forming chemicals which minimize swelling and shrinking due to moisture changes in the atmosphere. In its most effective form it is composed of thin veneers of wood laminated into panels and formed into the desired shapes and sizes.

"Because it achieves almost complete dimensional stability," Behm said, "it can prove of tremendous value as a



all-birch plywood

From the world-famous forest resources of Finland, imported all-birch plywood—sizes up to 4′ x 6′, all thicknesses . . . cut to size to buyer's specifications. • All-birch ¾″ 13-ply or 15-ply laminates for cabinet doors, table tops, etc.; lumber core for table tops; door panels of birch plywood (⅛″ 3-ply). • Also standard hardboard, ¼″ thickness, with an exceptionally hard surface. • *Dependable deliveries from Finland's oldest plywood source. Quotations submitted—your inquiries invited.*

FINWOOD INDUSTRIES INC. Station Plaza, Ramsey, N. J.

material for such purposes as industrial die models and patterns.

"Aside from the impregnation process, manufacture of impreg involves the same basic procedures employed in making hardwood plywood; that is, a number of plies are laminated into panels by gluing. Thus, hardwood plywood producers are in a favorable position to tool up for manufacture of impreg when the situation warrants such action.

"The performance of the material to date indicates that it should enjoy ready acceptance in markets which heretofore have not been served by the hardwood plywood industry. Developing those markets and serving them presents a challenge which the industry should meet with confidence.

"The most dramatic illustration of the fact that impreg has 'arrived' is seen in its current use by the Ford Motor Company. Ford is utilizing the material in several die models for its 1956 cars."

This development was reported in a paper presented at the recent annual meeting of the Forest Products Research Society at Grand Rapids, Mich. Authors of the paper were Ray M. Seborg, a chemist for the Forest Products Laboratory of the U.S. Department of Agriculture, and A. E. Vallier of the Ford Company. Vallier is manager of Ford's experimental fabricating department.

Slim and Sleek as a

MODERN DIESEL TRAIN

That's the Dependable Electro-Unit Drive Moulder . . . no excess wasted weight, yet the solid cast iron base, precision balancing, removable cartridge type spindles, and many advanced design features mean maximum moulder production per pound of machine! You want the weight where it counts to produce results!

Engineered around today's production needs, the Dependable Moulder is compact. You get superior finish, quick changes in set-ups, multiple-knife work, variable speed drive up to 150 FPM, fewer knives running at higher spindle speeds, lower operating costs.

If you want to "go places" in a hurry and at the same time improve your quality, turn your moulder production over to the "slim and sleek" Dependable Moulder, the machine that has the ability that produces results — a heavy machine yet one without needless weight!

You, too, deserve to profit by the excelient performance of a Dependable Moulder!

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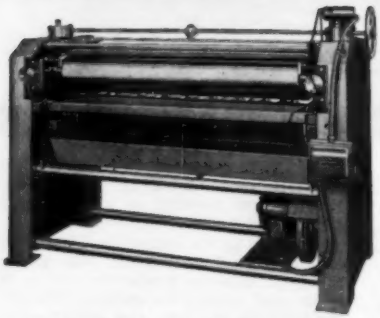
NEW *Bulletin C-121*

Dependable MACHINE COMPANY

WOODWORKING MACHINERY

GREENSBORO, NO. CAR., U.S.A.

a UNION machine...
TO MEET ANY WOOD GLUING NEED



Name of Union agent in your territory supplied on request.

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Write for your free copy of Union Booklet, "The How's and Why's of Wood Gluing," by Thomas D. Perry.

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UNION SERVES OVER 2,000 SATISFIED CUSTOMERS

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Unexcelled for accurate, economical operation in spreading all types of coatings. Standard models take sheet widths from 12" to 108"; thickness variance from 0" to 2". Available with hollow rolls to permit circulation of cold water through them, thereby prolonging the pot life of resinous adhesives. A reduction of 15° will double your pot life. Available with rubber-covered doctor roll at no extra cost.

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Union makes equipment for every standard production job in wood gluing. Also designs and makes machines for special applications—including machines for electronic gluing. Write for data on the complete Union line.

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USERS SAY UNION CUTS COSTS — SPEEDS PRODUCTION

They and their organizations, along with several firms, including two plywood manufacturers, cooperated in producing the Ford die models about a year and a half ago under a Ford research grant. Groundwork for the project, however, had been laid by the Forest Products Laboratory in 15 years of successful research.

The paper explained that "since the beginning of mass production of cars the body parts have been stamped out by steel dies. In order to make the steel dies, models of the correct size and shape must first be made of wood. Since the wooden models determine the shape of the steel dies, it is highly important that these models do not change dimensions appreciably from the time the models are made until the steel dies have been completed and production has started."

Changes in dimensions of the wood models, if not corrected, would be reflected in the dimensions of the steel dies, with the result that the car body parts would not fit together exactly as designed, the paper explained.

It added that making such changes often involves reworking the entire surface of the models. This not only is expensive in itself, but entails costly delays in the production schedule.

The new Ford die models, which have demonstrated their dimensional stability

Sturdy, Strong, Band-Saw Guide

MODEL 20

Paddock

BALL-BEARING

BAND SAW GUIDES

MODEL 20, shown above, can be installed on machines having 2 ½" back of blade to guide post. It's designed to work above or below saw table. Inter-changeable ball-bearing wheels give friction free support to blade. Cut out section pictured: shows grooved thrust wheel that holds back of blade. Side wheels and thrust wheel run with blade. Easier and better adjustment for thrust wheels for ⅛" to 1¼" wide blades. Models for large or small machines. Give size, make of machine on which guide will be used. Write for circulars, prices, etc.

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WHERE VALUE IS QUESTIONED

PADDOCK TOOL COMPANY

Guide Makers Since 1920

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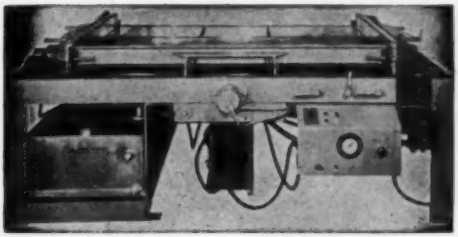
in exhaustive tests, were constructed of panels built up from veneer sheets of Honduras mahogany 1/10-inch thick. The sheets were soaked in phenolic resin, then heated to cure the resin before being glued into panels.

"Impreg should be highly desirable in many industrial applications," Behm declared, "where dimensional stability of patterns is required. An appreciation of the unique quality of the material is gained when it is remembered that all materials are affected by either temperature or moisture.

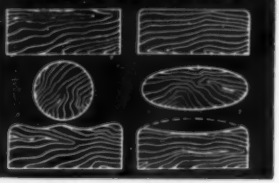
"Metal, for example, expands under the influence of heat. Wood is relatively unaffected by temperature changes, but is subject to expansion as a result of moisture absorption. Impregnation of the hardwood veneers largely overcomes that problem, since the chemical impregnants serve as a sort of 'moisture barrier' restricting moisture from the cell walls of the wood. Thus, ex-

WELDON VENEER BANDING PRESS...



Here's a press that will take any shape panel . . . a few are pictured above. There are also other advantages, a few of which are listed. You can do your veneer banding job faster and better with a WELDON. Write today for complete data and list of users.

for such typical shapes as these



PLUS VALUES:

1. Bands applied in 20 to 30 seconds curing time for resistance heatings.
2. Self contained hydraulic power unit.
3. Completely automatic controls, including interval timer and thermostat.
4. Just 10 seconds to change panel size!

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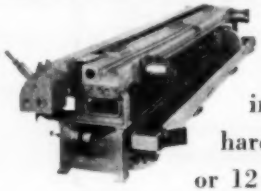
777 GREENWOOD ROAD • YORK, PENNSYLVANIA



The GLOBE TRAVELING HEAD JOINTER with wide veneer clamping surfaces is highly recommended for hardwood veneers. Furnished in 8, 10, or 12 foot sizes with or without glue pot.

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Plywood Saws
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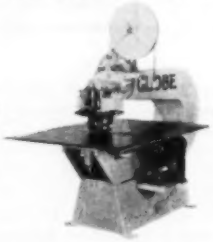
for quickly and conveniently joining veneer sheets together



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Wood Screws—Phillips or Slotted: flat, round and oval in steel, brass, silicon bronze, aluminum and stainless steel; sizes 3/16" No. 0 to 7" No. 30. Stove Bolts—slotted steel in round and flat head styles.

Packaging: Wood screws and stove bolts in confusion-proof, soil and moisture resistant green boxes with easy identification label. Bulk screws in indestructible steel cans with replaceable lids. Prompt service.

Samples and attractive new wood screw catalogue, free upon request. Box 1360-D

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WOOD SCREWS • STOVE BOLTS

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pansion of the impreg die models is less than a third of that normally expected from conventional die models.

"The heat resistance of the material also suits it for various uses. In experiments at the Ford company impreg was subjected to 400 degrees temperature for as long as 41 hours without charring.

Behm agreed with the prediction[1] by Seborg and Vallier that when the material is available in commercial quantities, finished die models and patterns made from it will be comparative in total cost with models and patterns made from conventional boards.

I have yet to find the man, however exalted his station, who did not do better work and put forth greater effort under a spirit of approval than under a spirit of criticism.—Charles M. Schwab

dependable **HARDWOOD DIMENSION**

- finished, semi-finished, or rough
- lumber or parts
- solid or laminated
- corestocks, blocks
- wood-and-plastics
- Gam-en-wood

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Engineered Wood Parts in Southern and Appalachian Hardwoods, Walnut, or Mahogany.

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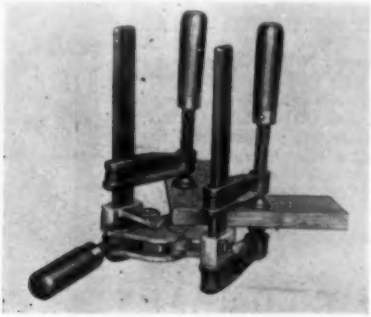
TRIPLE ACTION CLAMP

A new universal triple action clamp has been designed not only to greatly simplify clamping, but also the pulling



apart and gluing of miter joints, corner joints, or any other joint in irregular frames. This clamp has a variety of applications in the woodworking industry, and is particularly useful in chair and sofa manufacturing and repair work.

The Wetzler triple action universal clamp consists of two upright quick action clamps having ½" dia. spindles with deep cut Acme threads. Its freely movable swivel plates adjust readily to curved or beveled surfaces. The two clamps hold the two parts to be joined while the horizontal spindle controls the side adjustment for either pulling two joints apart or pressing them together.

The Wetzler universal clamp makes it possible to perform three clamping operations necessary for the aforesaid applications by means of a single clamp.

Wetzler universal clamps are supplied in the light duty type (No. 62) and the heavy duty type (No. 63) with loading heights of 4" and 6", and loading depths of 2" and 3", respectively. The side adjustment on both types is 5". Further information will be promptly given by the Wetzler Clamp Company 43-15 11th Street, Long Island City 1, N.Y.

HIGH GRADE
FACE VENEER
WALNUT — OAK — MAHOGANY
PRIMA VERA — EXOTIC WOODS

DAVID R. WEBB CO., INC. — Edinburg, Indiana

The Revolving Glue Clamp Carrier

by *Charles Presnell*

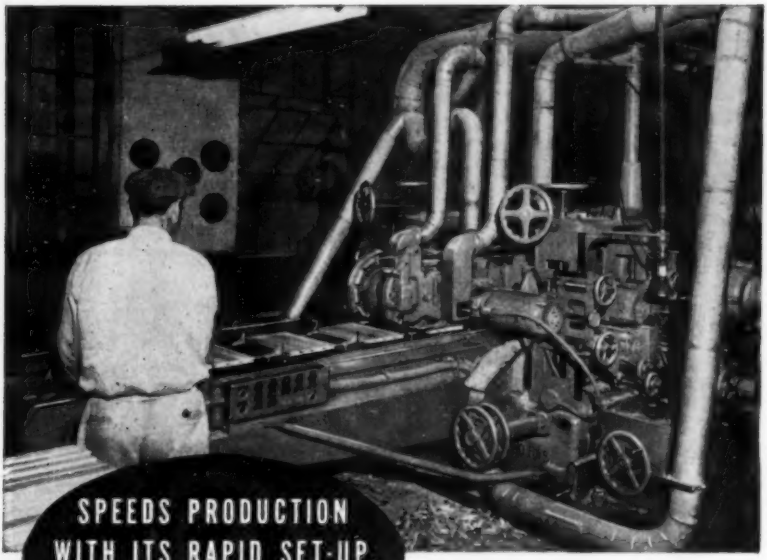
In 1903 Nels J. Billstrom of Rockford, Illinois, invented the revolving glue clamp carrier, which created much interest in woodworking circles and revolutionized the operation of edge gluing. Instead of stock in individual clamps laying around for hours, the machine did such a good clamping job, that after making one circuit around, stock could be removed and the clamps re-loaded, making the operation continuous. The Billstrom was the original clamp carrier and was the only one on the market for a number of years.

Application for patent was made in April 1903 and the patent, covering the complete machine, (not just an individual clamp) was issued in September 1903. Due to its being the first such machine, the U. S. Patent Office certified a trademark to Nels J. Billstrom reading "The original glue clamp carrier."

The picture shows the first machine built in 1903 and installed in a Rockford factory where it was in continuous operation until 1952 when the factory closed out. It was then resold to a firm in Pennsylvania where it is presently in operation.

During the past 50 years, the Billstrom carriers have been furnished with many attachments for special work, such as two way clamping, edge banding, offset work, oval casket tops, etc., and all kinds of dimension clamping. They are made with 12, 16, 20, 30, 40, 50, and 60 sections. From 6'6" wide to any width according to length of stock and with clamp capacities, 30" to 44" and with jaws 2½" to 8½" high. Sections are widely spaced to allow plenty of air circulation to the stock. On machines with 6" and 8½" jaws, every section can be loaded without interference with other sections.

To most men experience is like the stern lights of a ship which illumine only the track it has passed.



SPEEDS PRODUCTION WITH ITS RAPID SET-UP, ACCURACY, FLEXIBILITY

. . . Greenlee No. 545 Double-End Tenoner

Here's what California Furniture Shops, Los Angeles, has to say about their GREENLEE No. 545 Double-End Tenoner, which they purchased in 1948.

"We are particularly pleased with its rapid set-up, accuracy, and flexibility. Since the installation of the No. 545, we have not had a moment's production loss from breakdown or mechanical failure of any kind.

"Production has been higher and the quality of work better. In fact, when the need came for a double-end cut-off saw, we purchased the GREENLEE No. 542 because of the similarity between it and the No. 545 Double-End Tenoner.

"To anyone considering the purchase of a Double-End Tenoner, we cannot recommend the machine too highly."

This is just another example of the satisfaction and important production benefits you, too, can expect from this outstanding machine.

For, as "a woodworking plant in itself," it performs *15 separate operations* swiftly, accurately . . . even processes serpentine and other irregular shapes. And it steals job after job from single-purpose machines to streamline production, lower your costs.

Get complete specifications today . . . ask for Bulletin 545. Greenlee Bros. & Co., 1868—20th Ave., Rockford, Illinois

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GREENLEE

GREENLEE WOODWORKING MACHINERY: MORTISERS • BOREJS • SAWS • TENONERS • PLANERS • SHAPERS • MORTISING and BORING TOOLS

HARDWOOD EXHIBIT

Heading for the Midwest on your vacation? If you're planning to visit the Chicago area, here's a timely tip on how you can have fun while learning an interesting bit of Americana—the role which hardwood lumber products play in our daily lives.

A $400,000 Hardwoods Exhibit at Chicago's world-famous Museum of Science and Industry is one of the outstanding tourist attractions in the windy city.

This industry-sponsored project has been a "must" for tourists, vacationers and students since its opening in March 1953. During 14 months of operation, the exhibit has been viewed by nearly two and one-half million persons—two-thirds from outside the Chicago area, according to the National Lumber Manufacturers Association.

Covering about 10,000 square feet, an area equal to the floor space in 10 to 12 average-size houses, the exhibit contains dramatic examples of the hundreds of ways in which hardwoods serve the nation's population.

ROLLER NOW SALES MANAGER

J. S. Roller has been promoted from assistant general sales manager to general sales manager of Firth Sterling Inc.

Mr. Roller joined Firth Sterling Inc. in 1951 as vice-president and general manager of the Method X Company, a Firth Sterling affiliate, after having served for 15 years in various capacities in the sales department of Republic Steel Corporation.

NEW COURSE IN HARDWOOD DIMENSION MANUFACTURING

In cooperation with the School of Forestry at North Carolina State College, Raleigh, North Carolina, the Hardwood Dimension Manufacturers Association is sponsoring a four-year college course in the manufacture of hardwood dimension lumber.

The establishment of this four-year college course in hardwood dimension manufacturing, which will accept its first enrollees at the 1954 fall session, not only offers opportunity for young men to obtain training which will prepare them for technical and executive positions with hardwood dimension manufacturers, but also creates a source of trained men to which the dimension industry can look for its "executives of tomorrow."

Hardwood dimension is the term applied in the woodworking industry to partially machined or completely machined wood parts for use in the assembly of furniture, displays, and other products made of wood, as well as the wood components for industrial equipment. The Hardwood Dimension Manufacturers Association is composed of a group of manufacturing concerns specializing in this field whose aim it is to improve methods and service to the users of wood in its many forms.

Students who are interested in a career in the hardwood dimension industry may contact the Hardwood Dimension Manufacturers' Association, 218 Broadway National Bank Building, Nashville, Tennessee, or Professor Roy Carter, School of Forestry, North Carolina State College, Raleigh, North Carolina for further details.

This advertisement appeared in
BUSINESS WEEK—May 15, 1954

Why this giant pipe is made of wood

This 60" all-wood pipe now conveys highly corrosive waste liquor from a pulp mill to a disposal area. The pipe line runs above ground, underground and, in one area, 15 feet below a river bed!

The pipe had to be strong, waterproof, acid-resistant and flexible enough to conform to uneven terrain. Treated wood did the job! The laminated wood hoops, tested to outward pressures of 78,000 lbs., were glued with CASCOPHEN, Borden's waterproof resorcin resin glue.

When you need a material to stand weathering, water, mold—as well as acids and alkalies—see a good engineer in wood . . . and see Borden's to insure proper gluing. Address: The Borden Company, Chemical Division, Department BW-54, 350 Madison Avenue, New York 17, N. Y.

ADHESIVES * CASEIN * INDUSTRIAL CHEMICALS
RESINS * POLYMERS * MOLDING COMPOUNDS

THE *Borden* COMPANY
CHEMICAL DIVISION

ATKINS APPOINTS

Robert J. Sutton has ben appointed treasurer and secretary of Atkins Saw Division, Borg-Warner Corporation, Indianapolis. The announcement, by Atkins' president, Stanley J. Roush, also named Ellery Levitts asistant treasurer and Howard O. Wiesen assistant secretary.

Sutton, who joined the saw company in 1947, was formerly assistant secretary and assistant treasurer.

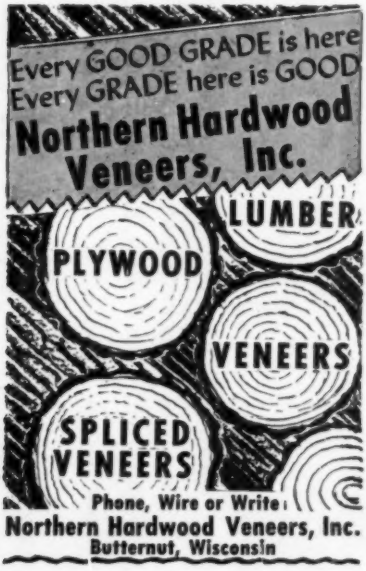
PLYWOOD INSTITUTE MEETS

Upward revision of quality control standards, adoption of simplified grade terminology and addition of a full-time inspector were among the highlights of the Hardwood Plywood Institute's recent summer meeting at Ponte Vedra, Fla.

The institute also voted to file a formal complaint before the U.S. Tariff Commission, asking for restoration of duties on hardwood plywood imports to 1945 levels and imposition of import quotas.

President George S. Lester announced that the group's action on quality control would "establish a new high standard for the industry, in line with the institute's accelerated efforts in the direction of continuing product improvement to parallel its vigorous trade promotion program."

The proposed new specifications, to be recommended to the Department of Commerce as a revision of Commercial Standard CS-35-49, would call for a 10-cycle test of alternate wetting and drying for Type 2 hardwood plywood and a 2-cycle test for Type 3. Type 2 is highly water resistant, retaining practically all of its strength when subjected to occasional thorough wetting and drying. Heretofore it has been required to pass only a 2-cycle test. No test previously was required for Type 3, which is dry bond hardwood plywood suitable for uses where water, dampness or high humidity is not a factor.



Nutting

Most Complete Line of Floor Trucks in America

Figure 321—Lumber Buggy. Large wide tread wheels for outdoor as well as indoor use.

Figure 4—Balance style for turning sharp corners. Variety of superstructures and wheel sizes.

Figure 1151—Timber Dolly. Used as a dolly or, inverted as a portable roller.

Figure 2419 and 421—Jacks and Skids. Stores and transports materials with one-time handling. One Jack services many Skids.

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Customarily, any features added increase the price of a product, but not so with CLAMP NAILS Wood Joint Fasteners! You actually reduce your joining costs 50%, and at the same time you have a product that is immune to atmospheric conditions.

In using CLAMP NAILS, you use NO GLUE or intermediate joining agents that can dry out—you eliminate drying time, tools and space—you have a better, yet lower priced product. Consult us for recommendations on your production. Save—Sell for less—Produce a better product.

CLAMP NAIL COMPANY

4542 West Palmer St. Chicago 39, Illinois

SEPTEMBER

Western Pine Association, semi-annual meeting, September 2-3, Multnomah Hotel, Portland Ore.

American Forestry Association, annual national conference, September 6-9, Multnomah Hotel, Portland, Ore.

OCTOBER

Architectural Woodwork Institute, 2nd annual convention, October 15-16, LaSalle Hotel, Chicago, Ill.

Pacific Logging Congress, 45th session, October 25-27, Multnomah Hotel, Portland, Ore.

NOVEMBER

Southern Sash & Jobbers Association, 15th annual winter meeting, November 30, December 2, New Orleans, La.

DECEMBER

Fourth World Forestry Congress, December 4, New Delhi, India.

Western Forestry & Conservation Association, annual meeting, December 8-10, Fairmont Hotel, San Francisco, Calif.

STATE U. HELPS INDUSTRY

In reviewing its service to industry during 1953-54, the State University of New York College of Forestry in Syracuse, points with satisfaction to the Jamestown, N.Y. Area Furniture Institute which was directed under the sponsorship of the Jamestown Area Furniture Manufacturers' Association. In late spring, 19 factory executives, who began their bi-weekly classes last September, received graduation certificates from Dr. Hardy L. Shirley, dean of the College.

The Jamestown area, which includes not only Jamestown itself but also communities like Falconer, N.Y., Salamanca, N.Y., and Warren, Pa., is one of two furniture centers in New York state. New York City is the other. Together they contribute to the state's high ranking as a furniture producing area.

Seventeen classes were held at the Jamestown Hotel. Each of the 19 regularly enrolled students had the privilege of bringing in visitors. Attendance at the sessions ranged from 35 to 53.

"HARTFORD" CLAMPS

Style 5G: Deep engagement clamps. Quick acting. Take the place of "C" clamps. Speedily adjusted.

Double bar clamps. Prevent buckling. Especially adapted to thin work. 32 Clamp Styles Available. Write for free Catalog Today.

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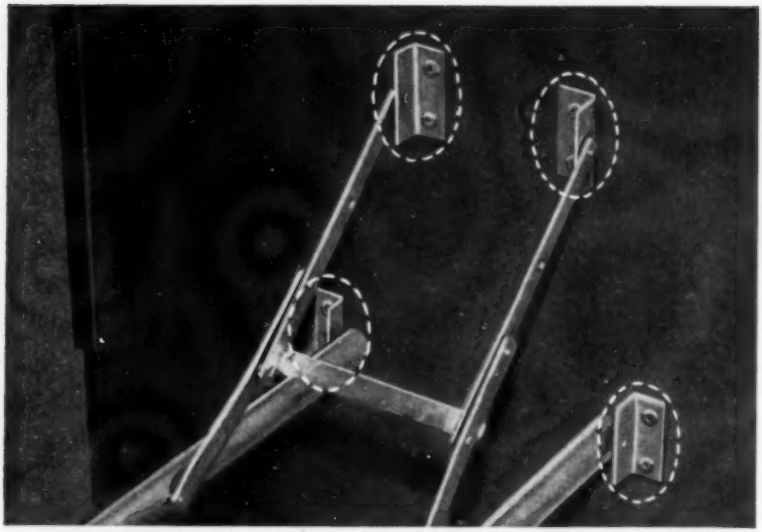
The HARTFORD CLAMP COMPANY EAST HARTFORD, CONN. Est. 1915



PRODUCTION INCREASED 33% WITH SOUTHCO DRIVE RIVETS

A Philadelphia manufacturer of food display equipment and banquet tables fastens folding aluminum legs to ¾" plywood table tops with SOUTHCO Drive Rivets because they are fast, strong and don't mar the table top. Nuts and bolts previously used required countersunk surface holes which, even though filled and sanded smooth, still marred the surface. Wood screws were tried but they pulled out. Four assemblies are now made in the time formerly required for three.

SOUTHCO Drive Rivets are ideal for metal-to-wood applications. How can you benefit from using them? Write for complete details to Southco Div., South Chester Corp., 240 Industrial Highway, Lester, Pa.

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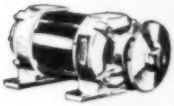
Irvington #15 Accura-Gauge Lumber Stop. Unique four-way squeeze on bar. Fully machined. Protected lever. Designed to operate 3/8" from next stop. Standards included. Inserted steel rule — either hand.



Irvington #41 Ball Bearing Motorized Saw Arbors. 3, 5 and 7½ H.P. at 3600 RPM. 5, 7½ and 10 H.P. at 1800 RPM only 7⅛" diameter! High efficiency! Left or right hand. 3 mountings.

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Safeguards the operator. Because of Irvington's unobstructed vision feature, he stands at arm's length away. *Remember safety is your most important asset.* You provide for it when you buy an Irvington No. 19.

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New Literature

SPRAY PAINTING CATALOG

The Binks Manufacturing Company 3122 Carroll Ave., Chicago, Ill., announces the publication of Catalog 956. This 74-page book covers the complete line of Binks spray painting equipment.

The 1100 products and accessories have been classified into 11 sections for fast reference. These sections are shown on the front and back covers of the catalog and are keyed with the pages by a special thumb index which makes it easy to locate any product instantly without reference to the index.

Because of the importance of correct nozzle selection when applying modern finishes and coatings, the new 956 Catalog devotes 8 full pages to this subject. Easy-to-read tables show the correct fluid and air nozzles, air requirement

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and needle for each of a wide range of fluids, from standard paints to airplane dope, heavy materials and adhesives.

BULLETIN ON DUST CONTROL

A bulletin showing how wood dust can be profitably controlled in the production of patterns, furniture, shipping, crates, pallets, and a host of other products where sawing, planing, drilling, sanding, etc. are done is the subject of a new bulletin just published by American Wheelabrator & Equipment Corp., 1344 S. Byrkit Street, Mishawaka, Ind.

One plant described in this report has been saving $6,000 yearly in fuel costs alone, since dusty air treated by its Dustube collectors is made so clean that it is recirculated back through the plant. This eliminates the need for many air changes which would necessitate the waste of heated air. Two companies described in this bulletin are channeling their collected wood dust to the boilers and using it for fuel, to achieve some savings there.

Several illustrations described how specific pieces of woodworking equipment are hooded and how duct work carries the dust away to the collectors.

SAVE UP TO 90% WORKING TIME

NEW Festo TWO-SPINDLE MOULDER

with Automatic Feed

Front spindle is removable and an extension table can be supplied to convert moulder into a Single Spindle SHAPER with power feed.

- Quick set-up
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Now . . . the small and medium-sized shop can produce all the numerous types of bars, such as louver boards, rungs, mouldings, etc. . . . speedily and economically with this new Festo Two-Spindle Moulder. Available as bench or floor model.

Write for Complete Information

Festo FESTO WOODWORKING MACHINES

745 51st Street Brooklyn, N. Y.

NAILING BULLETIN

The G. M. Diehl Machine Works, Inc., of Wabash, Indiana, have published a bulletin on their new hydronic nailing machine. This bulletin gives complete information on the new and exclusive features offered on the hydronic nailer.

Precision built, the nailer is especially adaptable to woodworking plants mass-producing boxes, skids, pallets, and other units that require high-speed output. Electronically-controlled and hydraulically-powered, the hydronic has a push-button electronic master-control panel that provides positive, split-second picking of nails from feeders to chucks. Push-buttons also adjust work table. Smooth hydraulic action powers drivers for steady, straight-down pressure.

Judge not thy friend until thou standest in his place. —Rabbi Hillel

The Market Place

Rates for Classified Advertisements

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.50; 2 inches, $17.00; 3 inches (Maximum), $25.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill., making known your wants on either new or used machinery and the publisher will gladly assist you.

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Air Compressors, various sizes
Bandsaw, American 36", bb. v-drive
Band Saw, New Delta 20" bb. dmd.
Sand Saw, New Moak 30" bb. dmd.
Blowers, Sturtevant No. 70 & 55"
Borers, Greenlee 369-4 ft. M.D.
Borers, Greenlee No. 370 6 ft. horiz. dmd.
Borers, Moak SS 2 Spdle. horiz. dmd.
Borer, W&M No. 283B Single Spindle Vertical, dmd.
Boring & Sawing, McKnight 36F dmd.
Clippers, Coe 88" bd. & motor
Dovetailers, Dodds, 10 & 20 spindle
Frequency changers, 30 KW dmd. and 15 KW.
Glue Jointer, Diehl No. 66 bb. dmd.
Glue Jointer, Jenkins No. 243A bb. dmd.
Jointers, Glue, Yates-American No. 213 bb. dmd.
Jointer, New Moak 12", bb. dmd.
Lathe, Yates No. 74 bb. dmd.
Lathes, Mattison 56C and 57D
Lathe Heads, Mattison Hex. T-slot
Mortiser, Sidney, single spindle pb. bd.
Mortiser, Greenlee No. 228 Vert. bd. & motor
Mortiser, New Britain No. 7, bd. & motor
Mortiser, W&M No. 288—5 spdle. Horiz. dmd.
Moulders, Hermance 7" pb. bd.
Moulders, Mattison No. 222, 6" bb. dmd.
Moulders, Woods No. 107—12" pb. bd.
Moulders, Yates-American C-4—8" bb. & motor
Moulders, Yates-American C-89—8" bb. dmd.
Planer, Facing, Yates-American 36" with Jackson & Church feeder on base, bb. dmd.
Planer, Whitney 30" sgl. rd. hd., bb. dmd.
Planer, Whitney 30" sgl. rd. hd., bb. dmd
Planers, F&E—30" dbl. pb. bd. & motors
Planers, Berlin 36", rd. hd. dmd.
Planers, New Crescent 24" bb. dmd.
Planer, F&E No. 156 36x7 dmd. rd. head
Planer-Matcher, Yates A1-15"x6" rd. hds. pb. bd.
Redrier, Merritt 12 plate 36x72
Router, Defiance, 2 spindle bb. dmd.
Routers, Defiance sgl. spdle. high speed. dmd.
Sander, New Jefferson, hand block, bb. dmd.
Sanders, Mattison No. 134, pb. bd.
Sanders, Niagara brush, bb. dmd.
Sander, 48" double disc, dmd.
Sander, Smith 49" 2-drum endless bed, bd.
Sanders, F&E 60" 3 drum roll feed, dmd.
Sanders, McKnight sgl. drum 24"x16" dmd.
Sander, Oakley Model G2, bb. dmd. bd. block
Sander, Porter Cable vert. osc. dmd. sgl. spdle.
Sander, W&M No. 171 belt, bb., md.
Saws, DeWalt, 7½ hp, radial
Saws, Hermance Gang Rip, pb. & motor
Saws, Jenkins 105A dbl. cutoff bb. dmd.
Saws, New Delta-Crescent 12" tilt. arbor, dmd.
Saws, New Multiplex, 40A & 50A
Saws, Skilsaw, 2 hp. sgl. ph. radial
Shaper, Defiance dbl. spdle., bb. dmd.
Shaper, Whitney No. 389, dbl. bb. dmd.
Shapers, New Moak single spindle, bb. dmd.
Shapers, Greenlee No. 180 dbl. bb. dmd.
Shaper, Whitney double spindle, bb., md.
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DOVETAILER, Fay & Egan 15-sp. MD
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Two Greenlee 227 Hollow Chisel Mortisers, 95% new.
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Borer, 3 sp. Bell automatic, bor., $250
Borer, F&E bor. radial, 2 SP., NEW, $300
Cutoff saw, Porter swing, BB., MD., $150
Band saw filer, Wardwell, $75
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Molder, Smith 7 in., 4 side, $450
Planer, Powermatic 24 in. BB, rd. head, $650
Planer and Matcher, F&E 4 side, 24x8, No. 369, MD., $1000
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Ripsaw, Newman, self feed, in N.C., $250
Sander, F&E hand block belt, $185
Sander, drum and brush dbl. pneu., $50
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Sticker, Colladay 1 t., 7 in., 3 side, $350
Sticker, Houston 4", 3 side, $300
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One Press with eight iron clamps. — Made by Chas. E. Francis & Bros., Cincinnati, O.

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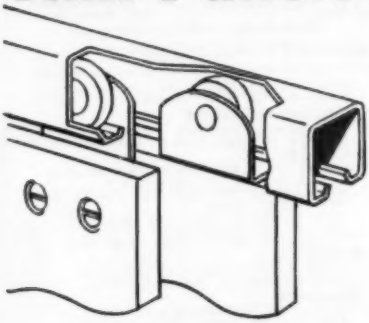

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Whitney 30-36-44" Sgl. Cabt., DMD
F.&E. 30" Sgl. Cabt., DMD, BB

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Porter No. 600 Si-Speed, B.B.

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Yates No. 431 31" 3-drum end. bed
Curtis No. 64 Auto-stroke, MD
Mattison No. 176 Edge Belt
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Planers, New Delta 13 x 5" B-C 12 x 4"
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Root Single MD vertical
Root single vertical MD, Motor Feed
Towsley 2 spindle, 2" to 16" with foot tr.

COMPRESSORS

Ingersoll-Rand, 5 HP
Westinghouse 5 HP

DOVETAILERS

Dodds 10, 15, 20 spindle

DOWEL MACHINES

Hawker No. 2 All Ball bearing & roller bearing VBD

JOINTERS

American 12" Wedge Bed BB
American 16" Wedge Bed BB
Crescent 12" DMD
12" Colloday L. Powers, H. B. Smith, Crescent, Sidney
Northfield 12" DMD
Yates-American 16" DMD

LATHES

Mattison 55C, BB, live tailstock

LOCK CORNERS

Morgan 16" Camera lock corner with carbide tip cutters

MORTISERS

Greenlee No. 228, Belt Drive
New Britain No. 2 and 7
Northfield chisel mortiser, motor driven
Wallace chisel mortiser, motor driven

MOULDERS

Mattison No. 224 9" all electric, hopper fd.
Mattison No. 262 6" Drop Bed, BB, all elec.
Sherrill 6" MD BB
Yates-American, 18" DMD C55, BB

PLANERS

Buss 30" DMD
Greenlee No. 120 30" Double DMD DMF knife grinder
Monarch 20" CMD 5 HP with starter, New $675.00
Northfield 24" single, MD motor fd. No. 5
Whitney No. 32 36" BB CMD Knife Grinder
Whitney No. 32, 30" BB, Belt Drive
Whitney No. 29, 40" CMD, BB
Whitney No. 24, 30" Double, CMD
Yates-American B44 DMD sectional feed-flexible chipbreaker

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Ekstrom-Carlson 434
Onsrud Air
Onsrud 240
Porter No. 666

SANDERS

Beach Hand Block MD 2 HP
Newton Edge Sander
Peerless 9", 14" and 20" horiz. & vert.
H. B. Smith 3 drum 4 motors No. 404 BB
Vonnegut vertical drum sander
Wysong & Miles, Oakley, Mattison belt

SAWS

Fay & Egan No. 558 MD 1½ single phase
Toby T-12 5 HP motor
Crescent (extension base) V-belt drive
Tannewitz No. JDR DMD TA-revolving arbor 5 HP motors
Walker-Turner TA 5 HP motors

SAWS - CUT OFF

Heston & Anderson No. 5, No. 25 & No. 55
Multiplex 5 HP DMD BB
Mattison No. 244 DMD BB 5 HP motor
Porter No. B43
Wallace 2 HP DMD BB
DeWalt 1 to 5 HP DMD BB

SAWS - BANDSAWS

36" American, Tannewitz, Crescent, Oliver
30" VB Drive Crescent
27" Crescent Band Saw
32" Crescent guarded BB VBD
Fay & Egan 36", DMD, fully guarded
Northfield BB & DMD 20" to 36"
Yates-American B36 fully guarded DMD

SAWS - RIP SAWS

American No. 25 Chain in Table
Mattison No. 202 straight line 10 HP motor
Tidey 48" carriage
Tidey 30" carriage & boring attachment

BAND RIP & BAND RESAWS

Yates No. 281 Band Rip
Mershon 54" MD 40 HP motor tilting roll Band Resaw

SAWS - VARIETY

Northfield tilt arbor, DMD, 5 HP
Northfield Tilt Top DMD
Fay & Egan DMD Tilt Arbor 5 HP
Pryibil No. 10 tilt top, BB, all Alum. gages 50 other makes to choose from

SHAPERS

Advance Single spindle, clutch-driver, BB
American (S30) Single spindle, 5 HP & 3 HP
Collady SS BB 5 HP
Oliver No. 287 large top 7½ HP
Onsrud No. 200
Collady SS BB 5 HP
Whitney BD No. 89 single, large top
Whitney No. 202, BMD, 7½ HP, 4 work slides, automatic air holdowns
Whitney No. 34A Double

VENEER MACHINERY

St. Joe MD, 66" Trimmer
Greenlee Sash & Door No. 601

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Saw, Greenlee No. 427 Gang Rip, V-belt drive

Dovetailer, Dodds 20 spindle

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Allis Chalmers 40 H.P. Motor

Exhaust Fan, Buffalo No 50 MW, with V-Belt Drive
Westinghouse 30 H.P. Motor

Frequency Changer, Wagner 15 KW, 120 cycle

Head Grinder, Yates American M 7, motor driven

Jointer, Fay & Egan 16" Hand, ball bearing

Moulder, Ekstrom Carlson No. 464, 6"

R. F. Equipment, Thermex Model 2H, 2.5 KW, with air press and loading tables

Router, Porter No. 500 Electric

Router, Loeffler Horizontal Oscillating, multiple belt drive with motor

Sander, Yates No. 431 3-drum endless bed, direct motor drive

Sander, Curtis 8R1 Belt, direct motor drive

Sander, Lucas V-belt drive with motor

Sander, B.&M. 14" Horizontal Drawer, V-belt drive and motor

Sander, Wysong & Miles, No. 315 Edge Belt, direct motor drive

Sander, Wysong & Miles, No. 171 Belt

Sander, Wysong & Miles Edge, V-Belt drive and motor

Sander, Mattison No. 128 Belt

Saw, Multiplex B-60

Saw, Fay & Egan 30" Band, V-belt drive with motor

Shapers, (2) Whitney No. 134 and No. 57A, Double Spindle, direct motor drive

Tenoner, Greenlee No. 545, Double End, with Jump Dado

Tenoner, HB Smith, Single End

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Yates-American U90 H. S. Elec. Router
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Whitney No. 134 DMD B.B. Dbl. Spdl. Shapers
Moak No. 7 Belt. Mtr. Dr. Sgl. Spdl. Shaper
Whitney No. 295 DMD B.B. Auto. Shaper
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Harris LT-106 Ball Brg. Sgl. End Tenoner
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AID-TO-EDUCATION PROGRAM

Frank Greenwall, president, National Starch Products Inc., has announced that final plans have been completed for the firm's aid-to-education program.

National, being very conscious of the present serious shortage of technical graduates, has made arrangements to establish undergraduate scholarships of $2000.00 each at Columbia University, Case Institute of Technology, the University of Nebraska, North Carolina State College, Syracuse University (N.Y. State School of Forestry), and Rutgers University.

While these scholarships are to be granted in the general fields of chemitry and chemical engineering, the applicant must have need for financial assistance and be outstanding scholastically and character-wise. The company also points out that the recipients of the scholarship are under no obligation as to future employment with National.

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Colladay 36" & 38" Motor Driven
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Root G300 Heavy Duty Hyd. Vert. Single
Root D210 Heavy Duty Hyd. Horiz. Single
Greenlee No. 369 3 Ft. Vert. Multiple, M.D.
Fay & Egan Motorized 2-Spindle Horizontal

CARVERS
Porter Ball Bearing Single Spindle
Gallmeyer & Livingston Single Spindle
Minnesota No. 308E 16-Sp. Multiple

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Handy No. 15 Portable End Clamp
Handy No. 444 Two-Way Air Clamp
Taylor 7½ Ft. 40-Sec. Chain Type

DOVETAILER
Dodds 15-Sp. Spiral Gear

GLUING MACHINES
Francis No. 3, 12" Hand Feed
Francis No. 280, 48" Edge Plate Gluer

JOINTERS—GLUE JOINTERS
6", 12", 16" & 20" Hand Jointers
Porter CM 16" Hand Jointer, D.M.D.
Diehl No. 60 Cont. Feed Glue Jointer

LATHES
Imperial Auto. Turning, D.M.D.
Mattison No. 55-C Ball Brg. Auto. Turning

MORTISERS
Wysong & Miles No. 283 F.F. Hollow Chisel
Wysong & Miles No. 284 P.F. Hollow Chisel
Fay & Egan No. 462 P.F. Hollow Chisel
New Britain No. 2 Chain Saw Mortiser, M.D.
Enterprise Ball Brg. Pulley Mortiser, M.D.

MOULDERS & STICKERS
Hermance No. 50, 10" 4-Side, B.B.
American Single Top Head Sash Sticker

PLANERS
Oliver No. 61, 24" Single Head, M.D.
Yates No. 152, 24" Single Head, M.D.
Colladay & Power 24" Single, M.D.

SANDERS
Smith No. 401, 42" 3-Drum Endless Bed
Fay & Egan 48" 3-Drum Endless Bed
Sheyboygan 48" 3-Drum Endless Bed, B.B.
Nash No. 65 Automatic Turning Sander
Mattison No. 137 D.M.D. Hand Block Belt
Beach No. 201 D.M.D. Hand Block Belt
Wysong & Miles No. 175 Universal Belt
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SAWS—CHAIN FEED & SELF FEED
Yates G-2 B.B. Chain Feed Rip
Hermance No. 300-G Self-Feed, B.B. M.D.
American No. 28 Chain Feed Rip, D.M.D.

SHAPERS
Porter No. 200 SVM Single, M.D.
Whitney No. 145 Single, D.M.D.
Oneirud W-123 Auto. With Frequency Set

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MISCELLANEOUS
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Borer, vert., Greenlee No. 371, 12", power feed
Borer, vert., Greenlee No. 369, ballbearing, 42"
Borers, vert., Andrew 42", power-fd., & 30", ft.fd.
Clamp carrier, Palmer 10-sec., 132-30-in., sap. 128 clamps
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Clamp, end, Handy No. 421, 90"x48", air
Dovetailer, Dodds, 15-spindle
Dowel Machines, Tannewitz, Hawker & Jenkins
Glue Jointer, ballb., cont.-fd., F&E No. 417, 3 motors
Lathe, variety, Smith B-42, ball bearing
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Lock corner cutter, Superior, single-end, hand-feed
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Moulder, 4-side, 14", Rowley & Hermance
Moulder, ball bearing, Smith 6", 4-side, motor
Moulder, 8" electric, F&E No. 777
Nailers, Morgan & Doig, closed and open-back
Planer, 24", F&E No. 500, ball bearing, 5 h.p.
Planer, single, Yates-American B-7, 30"x7", 6-roll, fast-feed, ball bearing, built-in motors
Planer, sgle-sub., 36" Whitney No. 52, ballb., mtr.
Ripsaw, glue joint, Mattison No. 202, two motors
Ripsaw, self-fd., ballb., F&E No. 504, 7½ h.p.
Ripsaw, gang, Hoesler, ballb., 14" arbor
Sander, 3-dr., roll-feed, Berlin 36", 4-motors
Sanders, 3-dr., o.b., Salem 49" & Smith 43", both late model
Sander, single drum, Yates-Am. No. 411, 42"
Sander, single-drum, Parks 38", power-feed
Sander, brush, Vonnegut, adj-arm., 2 h.p.
Sander, auto-stroke, 2' Mattison No. 124, 5 h.p.
Saw, double end, Hall, mitre, 72"
Screw Driver, Reynolds, motor
Stapler, 4-head, Saranac, 80", open-back
Tenoner, single-end, F&E No. 500, ballb., electric
Tenoner, double-end, electric, Englefield 60"x36", 9 motors
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40 Section Taylor Power Operated Clamp Carrier
New Air Operated Frame and Chair Clamps
Taylor Panel-Flo Edge Gluer

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12 Spindle Dodds with auto. feed for sides only
Pico Automatic Double End Dovetailer
Wysong & Miles No. 290 Auto. Dovetailing Mach.

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84" Union Dble. Rubber Roll Resin Glue Spreader

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Covel-Hanchett Band Saw Grinder
Practically New Stetson-Ross No. 872 Grinder
Woods No. 229M motor driven jointing stand.

JOINTERS

Diehl No. 660 Glue Jointer, Direct Motor Drive
Yates American No. 213 Direct Motor Driven Glue Jointer
24" Yates-American No. 1 Jointer

LATHES

Yates-American 42" No. 74, mtr. dr., ball bearing
Yates-American 30" T-5, motor driven, ball bearing
Mattison 42" No. 57-D motor drive ball bearing
Mattison 30" No. 55-C motor drive, ball bearing

MATCHERS

Woods 412M electric planer & matcher
Woods 504M Direct Motor Drive, Ball Bearing Hardwood Flooring Machine
Woods 503M Electric Planer & Matcher with double profile and automatic feed table
American No. 33 End Matchers
Yates A-1 Planer & Matcher

MORTISERS

Wysong & Miles No. 284 direct motor drive, ball bearing single spindle mortiser
Wysong & Miles No. 288 direct motor driven 6-spindle mortiser
Wysong & Miles No. 286 Hinge Seat Mortiser
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Woods 808M 4" Electric Moulder
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Newman 6" No. 46 Electric Moulder
Newman 12" No. 27 Ball Bearing Belt Driven
American 9" No. 35 Electric Moulder
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Hayes Sash & Door Sticker w/Plowing & Boring

SINGLE PLANERS

Buss 40" direct motor drive, ball bearing
Whitney 30" No. 32 Direct Motor Driven Ball Bearing Planer
Yates-American 38" No. 1 Jointer with Herzog Feeder

DOUBLE PLANERS

Buss 26" Double Planer
Yates-American 30" No. 177 ball bearing, direct motor driven with electric grinder
Whitney 30" and 36" No. 24 direct motor driven ball bearing, with grinder and jointer

SANDERS

Mattison No. 124 Automatic Stroke Sander
Pearson Waterfall Sander
Oakley Model H Drawer Sander
Nash No. 50 and No. 25 Turning Sander

BAND SAWS

Yates-American 36" Type Y-36 motor drive, bb.
36" Yates-American Motor Driven Ball Bearing Band Saw
Yates-American Type V-54 Roller Brg. Band Resaw
Berlin 44" No. 283 Band Resaw

CUT-OFF SAWS

Beach No. 3 Roller table double cut-off saw
Bell No. 24-B Double End Sawing, Boring and Chucking Machine
Fay & Egan No. 501-A Direct Motor Driven Ball Bearing Swing Saw
Eaglesfield Direct Motor Driven Ball Bearing Swing Saw

RIP SAWS

Eaglesfield Direct Mtr. Dr. Ball Brg. Rip Saw
New Marion Glue Joint Rip Saw, in stock here
Mattison No. 207 Direct Motor Driven Ball Bearing Glue Joint Rip Saw
American No. 15 Ball Bearing Chain Feed Rip Saw
Yates-American G-67 Chain Feed Rip Saw

ROUTERS

Yates-American U-9 Electric Router

SHAPERS

Whitney No. 251 Double Spindle Electric Shaper
Whitney No. 234 Double Spindle Electric Shaper
Whitney No. 395 Double Spindle Automatic Shaper
Onsrud W-125 Double Spindle Automatic Shaper
Onsrud W-125 Single Spindle Automatic Shaper

TENONERS

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Jenkins No. 95 Electric, double-end
Yates-American No. 55 direct motor drive heavy duty single end tenoner

VENEER MACHINERY

Francis 76" Hydraulic Veneer Clipper
Dennis Veneer Taping Machine, Motor Driven
Francis 84x36" hydraulic veneer press, M.D., with booster pump and overhead crane
Merritt 13 Plate redrier 60 by 36

MISCELLANEOUS

Salstrom 18-spindle Carver
Ekstrom-Carlson late mod. M.D. BB bedlock mach.
Wardwell Saw Filer
Morgan 7-track open back nailer with clincher
Williams Motor Driven No-Knife Hog
New Raimann Automatic Knot hole borer & plugger
Leitelt Lumber Lift
Mereen-Johnson No. 26 Auto. Boxboard Squeezer, 36"x36".

Sutton WOODWORKING MACHINE CO.

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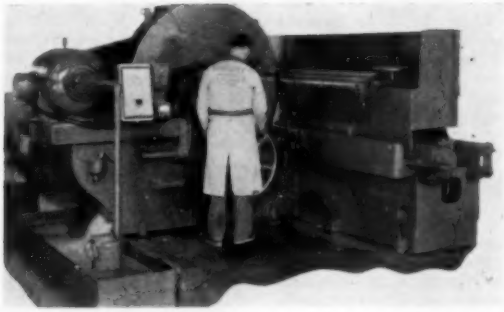
EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

'BIG 60' HOGGER KNIFE



The Hanchett Manufacturing Company, Big Rapids, Michigan, announces the development of an entirely new patented machine for grinding the bevels on all types of straight knives and shear blades. This particularly applies to chipper, hog and barker knives, and all types of heavy duty shear blades.

Incorporated in this entirely new patented development (for the accurate grinding of all types of straight knives and shear blades) are new features, making it possible to remove a tremendous amount of metal in the shortest time possible. With extremely heavy cuts possible at a high rate of table travel, using a large volume of coolant on the work pieces, knives and shear blades are ground with absolutely no burning or heat generation.

The Hanchett 'Big 60' hogger features a 60" diameter segmental grinding wheel with a 5" diameter precision ground grinding wheel spindle mounted in extra heavy duty pre-load precision Timken bearings. The automatic infeed of the 60" diameter wheel member is of unique design as it incorporates hydraulic cam actuated control mechanism, with graduated dial, in increments of .0005 as standard. Finer feeds are available when required. In addition to the automatic infeed, there is a large manually operated hand wheel, which makes this infeed a dual controlled unit.

The knife bar is mounted on top of

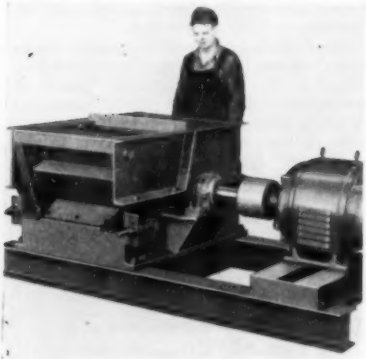
an extremely rugged heavy duty table which is hydraulically operated, with table travel speeds ranging, with finger tip control, from 10 to 100 feet per minute. Faster table travel feeds are available at no additional cost when the operation requires it.

HOG YOUR WASTE WOOD

Attracting a great deal of interest at the Woodworkers Industry Show were the Williams hog and the display showing the versatility of Williams equipment for the efficient disposal of wood waste. Whether used for fuel, or for grinding, separating and packaging for resale to manufacturers using ground wood in the new chip board and various other products, Williams hogs are adaptable for virtually any operation.

Specifically, when used to process waste wood into chips, sawdust or wood flour, Williams hogs, hammer mills, vibrating screens and air separators produce a product of consistently uniform size according to buyers' specifications.

When wood waste is used for fuel, Williams hogs can cut handling costs as much as three-fourths, in addition to preparing the scrap to produce the maximum amount of heat. Unhogged wood in long, large and awkward pieces restricts air flow, smothers the fire and creates excessive smoke. When properly reduced to chips by hogging, the wood burns more evenly, is completely combustible and yields the maximum of BTU's. Hogged wood is more easily handled with less labor also. In chip form, one man can handle as much tonnage as three men would be required to handle if wood scrap is left in big, odd-shaped, cumbersome pieces.



In a fully illustrated brochure, Williams describes the type of equipment used by dozens of woodworking plants for low-cost disposal of waste wood. A copy may be obtained by writing to Williams Patent Crusher & Pulverizer Company, 813 Montgomery Street, St. Louis 6, Mo.

DOVETAILER

Supreme Woodworking Machinery Corp., 50 Howard Street, New York, N.Y., announces a new semi-automatic dovetailing machine. Completely ball-bearing, this dovetailer offers several new improvements. Spindles are driven independently by worm gears. Uniform dovetails are assured because all cutters rotate in one direction—this simplifies the removal and cleaning of the cutters as well. Indicator scales and fine screw adjustments for all controls make "setting up" easy and accurate. Sump lubrication minimizes mainten-

SPEED UP PRODUCTION!

CUT DOWN OPERATING COSTS!

For Router

Exclusively designed VMT Dovetail Trimmer

For Multi-Spindle Machine

with **VMT** *Dovetail Cutters*

Precision with speed —is the unbeatable combination you get when using VMT Dovetail Cutters for mass production of furniture and case goods on routers and multi-spindle machines . . . made of Tungsten High Speed Steel . . . salt bath heat treated and precision-ground to maintain uniform cutting angle to last the life of the tool. Furnished with straight or threaded shanks. High Speed and Carbon Steel standard bits shipped immediately from stock.

New VMT Dovetail Trimmer is specially designed to eliminate extra router saw operation to remove excess material after making dovetail cut... saving valuable time, labor and production costs!

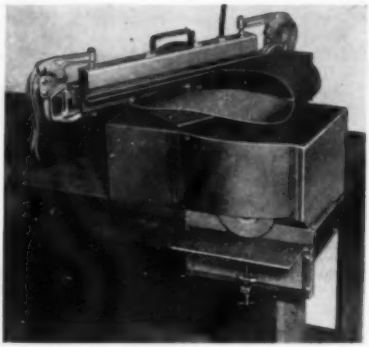
. . . Just off the Press - Send for your Copy Today! New VMT Catalog — complete with illustrations, details and how to order Virginia Machine Tool's Precision-Made Router Bits, Cutter Heads, Knives, Etc. for the Woodworking Industry.

Virginia MACHINE TOOL CO.

BASSETT, VIRGINIA

Precision-Made Tools For The Woodworking Industry—Standard or Milled to Pattern

ance and wear. The Supreme dovetailer makes furniture dovetails, secret dovetails, box taper dovetails, and others without attachments, and handles bent or curved work. Fully automatic models also available.



ECONAWAY ABRASIVE BELT SPLICER

Improvements and changes in the Econaway abrasive belt splicer, designed to increase the speed of splicing abrasive belts, improve the quality of splice, save shop bench space and allow a still larger saving in the cost of abrasive belts, are announced by Aget-Detroit Company, Ann Arbor, Michigan.

The improvements include: an enclosure for the motor, the belt drive and the arbor which carries the grinding wheel; cutter and press bars are now mounted on top of the enclosure so that the operator can perform the various steps in splicing any grit paper or cloth backed abrasive belts without moving from one station to another; an electrical curing press to reduce the curing time from 24 hours to less than 60 seconds. (The original unit employed a multiplicity of "C" clamps and required a 24 hour curing time.) Thus, there is not only a considerable reduction in the actual splicing time but

REJECTS?

from excess moisture?

Stop them with MOISTURE REGISTER!

Moisture Register electronic instruments cut down rejects because they tell you in seconds when the moisture content in your wood is just right for best bonding, cutting and finishing. They test 80 wood varieties to 0% with guaranteed accuracy. Simple to operate. Portable—you can make spot checks anywhere. Both needle and button electrode types available. Manufactured by pioneers in the field, backed by a one-year warranty.

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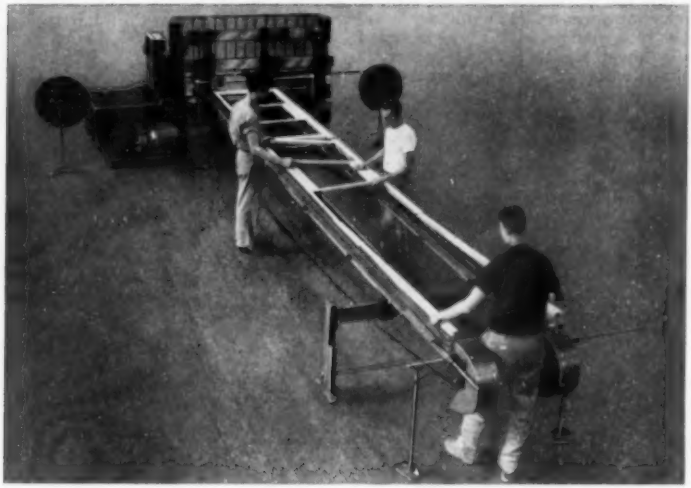
ELECTRONIC MOISTURE REGISTER

Mfd. by Moisture Register Co. 1510 W. Chestnut St., Alhambra, Calif.

SARANAC *Specialized* FASTENING MACHINES SOLVE PROBLEMS

CASE HISTORY NO. 1

SARANAC MACHINE BOOSTS PRODUCTION 900% PER MAN-HOUR



YES, 900% IS CORRECT! This is just one dramatic example of how specialized Saranac Machines often cut production costs astonishingly! In many cases—perhaps yours — a *standard* Saranac Machine, large or small, can deliver equally important savings in time and labor.

IN THE CASE ABOVE, the machine is a special multiple-head corrugated fastener driver, manufacturing modern flush door frames. Where 3 men formerly hand-fastened 53 door frames per hour total, they now produce 480 per hour! Quality is more uniform too.

IF YOU HAVEN'T INVESTIGATED the capabilities of Saranac Wire Stapling Machines—or Corrugated Fastener Drivers—do it now! Describe your problem and send samples of material if possible. We'll reply with suggestions.

SARANAC MACHINE COMPANY
BENTON HARBOR, MICHIGAN

Manufacturers of the World's Largest Line of Fastening Machinery

abrasive belts may now be spliced even while a sanding machine waits, since the splicing operation is completed so quickly and the newly spliced belt can be put into service instantly. An additional advantage is the reduction in space required for storing the belts during the 24 hour curing time as required with the old cold-press process. A vast increase of speed of clamping with the toggle type clamps, which are fastened to the lower segment of the press, is apparent when contrasted with the use of "C" clamps. Moreover, the toggle type clamp is always in position for instant action.

KNIFE SETTING STAND

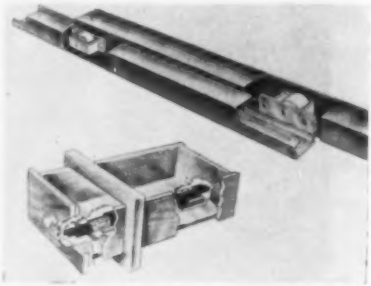
A new knife setting stand, field tested during the past year, has just been put on the market by Dependable Machine Company, Greensboro, North Carolina.

The S-1 setting stand is designed for setting straight knives, ground-to-patterns, and milled-to-pattern knives for all "slip-on" type heads.

According to the manufacturer, the importance of setting the knives in a cutter head accurately should not be overlooked. Knives not set accurately require heavy jointing to bring all knives to a proper cutting circle. This will produce uneven heels on the knives —light some places and heavy other places. A knife with a heavy heel, the same as a dull knife, has a tendency to pound or hammer rather than cut the wood. Accurate setting of the knives will make it possible to joint properly and produce smooth work.

CENTER DRAWER GUIDE

Twin-Set center drawer guide, recommended by architects; used by furniture manufacturers, cabinet shops, and sold through jobbers and hardware dealers, are specially designed for center guide construction, and they are the answer to every center drawer guide problem. Easy to install as center guide on drawers; or in multiples of two or



more, to compensate for extra weight in heavily loaded drawers, sliding platforms, etc.

Twin-Set center drawer guides give drawers the feather-touch operation. They insure straight alignment; offer snug fit and are non-binding, non-sticking, non-tilting. Twelve available sizes fits drawer lengths from 12⅝" to 24½". Write: Extension Drawer Support Company, Dept. 39, 2319 West Washington Blvd., Los Angeles 18, California.

MAPLE FLOORING

The Maple Flooring Manufacturers Association, 35 E. Wacker Drive, Chicago, announces a new printing of the popular "Please Don't" folder which explains to the builder, contractor and floor layer, that problems from expansion of kiln-dried hardwood flooring, caused by moisture absorption, can be

New No. 6 ELECTRIC TENONER

Here's the outstanding POWER Tenoner with built-in motor drives and simplified push button control. Fully ball bearing.

Furnished complete with motors and control, crank for adjustment, head bolt wrench, poppet stop and spring stop for table slide, adjustable hold-down for table, guards for tenon heads, knives for all heads, and a cut-off saw.

Now, available, is the new No. 6 POWER Electric Tenoner . . . the result of more than 80 years of service to the woodworking industry. Accurate workmanship, heavy construction and a host of features including simplified controls, motors which can be raised or lowered, separate adjustment, etc. Let us tell you more about the No. 6 . . . write today.

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PRODUCTION MORE THAN DOUBLED

THE LANE® COMPANY, INC.
Altavista Virginia
Permanent Displays New York, Chicago, San Francisco, Los Angeles, High Point

January 12, 1954

S. A. Woods Machine Company
27 Deerell Street
Boston 27, Massachusetts

Attention: Mr. H. C. Dodge, President

Gentlemen:

After six months' production operation with our Woods #1374-7" Electric Moulder, we feel you might be interested in our views of its performance.

In our opinion, it has proven beyond a doubt to be the best piece of moulding equipment for the production furniture manufacturer on the market today. Its high speed and exceptionally good quality work has enabled us to produce our requirements with lower unit costs of both labor and material. The tapered spindles and our ability to joint the heads off the moulder in our saw-filing room have permitted us to reduce setup times to a bare minimum. We are running exposed profile stock which we formerly ran at 30-40 f.p.m. at 80-100 f.p.m., and a large portion of our moulding as high as 150-155 f.p.m.

Our operators, foremen and plant superintendent are all highly [illegible] the performance of the moulder, and we feel your [illegible] engineering and development

Very truly yours,

J. W. Brandon

J. W. Brandon

with

WOODS ® ELECTRIC MOULDER

This Moulder with feed rates up to 160 F.P.M. is adapted to every woodworking plant that does moulding work of any [illegible] chairs, trim and interior finish.

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portion of our moulding as high as 150-155 I.p.m.

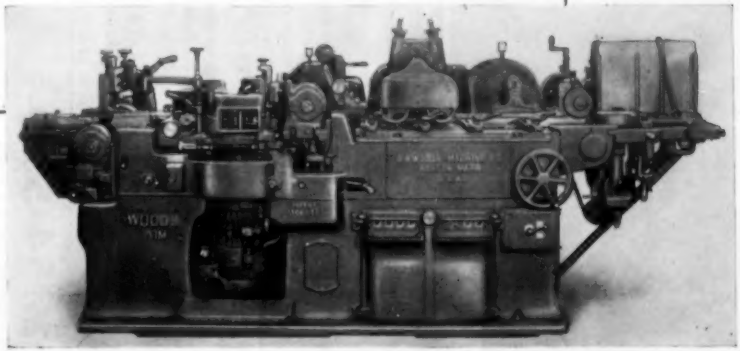
Our operators, foremen and plant superintendent are all highly
the performance of the moulder, and we feel your
engineering and development

Very truly yours,

J. W. Brandon
Plant Manager

JWB:vlf

working plant that does moulding work of any chairs, trim and interior finish.



WOODS 137M
Electric
Patented
"Lag Bed"
Moulder

S. A. WOODS MACHINE CO.

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Serving the Industry Since 1852

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Our operators, foremen and plant superintendent are all highly [illegible] the performance of the moulder, and we feel your [illegible] engineering and development

Very truly yours,

with

WOODS® ELECTRIC MOULDER

This Moulder with feed rates up to 160 F.P.M. is adapted to every woodworking plant that does moulding work of any

chairs, trim and interior finish.

formerly ran at 30-40 f.p.m. at
portion of our moulding as high as 150-155 f.p.m.

Our operators, foremen and plant superintendent are all highly
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engineering and development

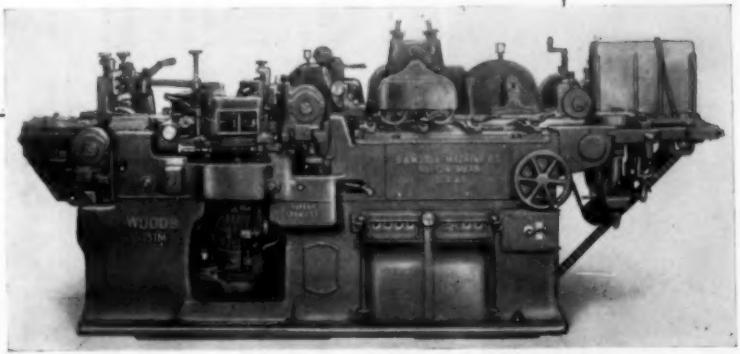
Very truly yours,

J. W. Brandon
Plant Manager

JWB:vlf

working plant that does moulding work of any

chairs, trim and interior finish.



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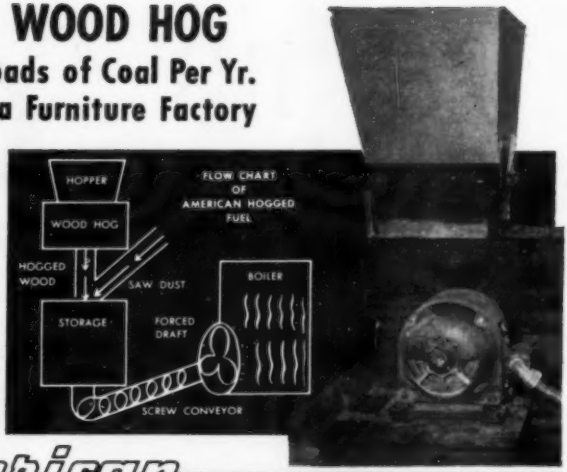
AMERICAN WOOD HOG

Saves 10 Carloads of Coal Per Yr. for N. Carolina Furniture Factory

Burning slabs of wood waste for fuel meant poor combustion, heavy smoke, the annual purchase of 10 carloads of coal for this factory. Today an American Wood Hog converts the wood scrap into boiler fuel for easier handling, storage, and feeding. The results: excellent combustion, little smoke, and *no coal* has been burned since installation...a saving of 10 carloads of coal per year!

WRITE for AMERICAN WOOD HOG Bulletin



American PULVERIZER COMPANY

1510 MACKLIND AVE. • ST. LOUIS 10, MO.

eliminated if the rules for efficient handling at the job site are followed.

The text of the folder is in two parts: Suggestions for the installation and care of Northern hardwood flooring. List of simple precautions to take in handling hardwood flooring at the job site.

HAMMER BLOW INSTALLS BLIND RIVET

Installed from one side of the job by one man working without special tools, a new 5/32"-diameter Southco blind rivet is applied with only a hammer. The rivet is inserted into a hole, and the pin protruding from the rivet head is struck with a hammer. Four prongs on the blind end of the rivet are thus expanded, forming a second head and pulling panels tightly and permanently together.

Since the head appearance is neat and attractive, no finishing operations are

1954-55
WOOD WORKING DIGEST DIRECTORY

Now in Preparation. Write for rates,

WOOD WORKING DIGEST **Wheaton, Illinois**

UP PRODUCTION—
Cut Costs!

PLANER KNIVES

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WITH *Supreme* KNIVES

You step up your production with Supreme Knives... milled to exact specifications... to insure a perfect fit in the machine. Made from the correct alloy steel for your particular job, Supreme Knives work harder... longer. The expense of early re-sharpening and replacing is eliminated. We design and make Special Knives to your requirements.

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We will promptly repair, retip and sharpen your Carbide-Tipped tools and get them back to you without delay. Skilled workmen and precision equipment insure fast service and complete satisfaction in restoring cutting efficiency.

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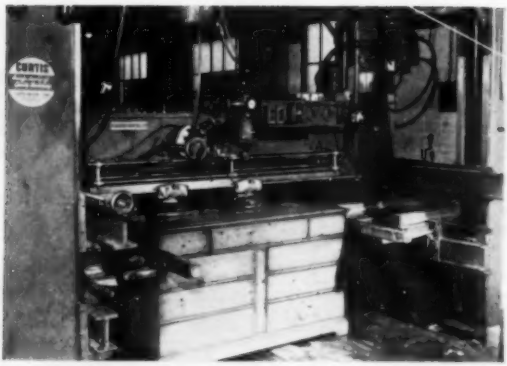


automatic ejection of coolant or rubbing compound; air controlled holding arms for holding complete case or top.

The hydraulic power unit glides the rubbing pads at speeds up to 250 strokes per minute. Infinite stroke length and speed adjustments are all within reach of operator. All adjustments can be made while the machine is in high or low speed operation.

NEW "WOOD" STOKER

Increased steam requirements and cost of supplementary fuel prompted a large veneer and lumber mill to check performance of wood burning Flo-Matic Fyr-Feeder stoker manufactured by the American Coal Burner and Wood Stoker Corporation, 18 E. Erie St., Chicago, Illinois.

In the fall of 1952, one of their 150 h.p. H.R.T. boilers was reset and furnace arranged to receive a Flo-Matic Fyr-Feeder to burn hogged wood refuse. The spray-spread system employed by the Flo-Matic Fyr-Feeder for introducing hogged fuel into the furnace is a departure from the conventional Dutch oven and "pile" burning of refuse fuels.

Management advised that the reset boiler equipped with Flo-Matic Fyr-Feeder is delivering 30% more capacity and burning fuel more efficiently than the adjacent 150 h.p. boiler with Dutch oven.

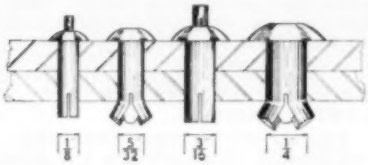
Third boiler is gas fired. Previous to Flo-Matic Fyr-Feeder application this boiler was in service daily. However, with the increase in firing efficiency and boiler capacity effected through Flo-Matic firing, gas is now used only over week-ends.

"Real happiness is cheap enough, yet how dearly we pay for its counterfeit."

needed: no buffing or grinding, no stem to be trimmed.

Because pulling, exploding, or twisting actions are unnecessary, all costly special expanding tools are eliminated. Thus, the number of workers who can install Southco blind rivets is not limited by the number of tools present in the plant.

The Southco blind rivet is now pro-



duced in four diameters (⅛", 5/32", 3/16", and ¼") and in a range of grip lengths from 1/32" to ⅝".

For complete information, write to Southco Division, Dept. WD, South Chester Corporation, Lester, Pa.

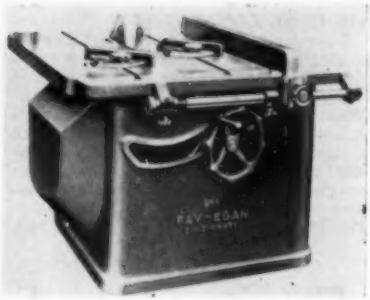
TILT ARBOR SAW

A new Fay & Egan tilt arbor saw has just been announced by the well known Cincinnati manufacturer. Known as the No. 911 ball bearing universal tilt arbor saw, the machine makes a 6" maximum cut and can be equipped with extension and auxiliary traveling tables to give practically unlimited dimensional capacity.

The new saw can be equipped with blades up to a maximum of 20" in diameter. The saw arbor tilts to a 45° angle by means of a convenient hand wheel while another wheel controls the depth of cut. Arbor speeds can be either 2,500 or 3,600 r.p.m. with a 5 h.p. motor.

The entire saw has been redesigned for appearance, maximum convenience and utility in all types of wood sawing.

Among other interesting features, the manufacture lists: 43¼ x 43¼ table on heavy, rigid cast iron column; a pair of miter fences in heavy dovetail slides; a rip fence with quick and fine adjustment and a gauge mounted on the table



edge; automatic v-belt tension with hinged motor base; fully guarded for safety; all controls convenient to operator.

Table extensions, ball bearing cut-off traveling table and eccentric quick-acting clamp can be supplied as additional equipment. Detailed literature will be supplied on request to the manufacturer; J. A. Fay & Egan Co., Dept. WD, Cincinnati 2, Ohio.

HYDRAULIC AUTOMATIC STROKE RUBBING MACHINE

The Curtis Machine Corporation of Jamestown, New York, has announced the production of a new hydraulic automatic stroke rubbing machine for the furniture industry.

The Thomasville Chair Company, Thomasville, North Carolina, is currently using six of these machines with outstanding success.

The machine, Curtis Model 48-R4, will be shown at the Woodworking Industrial Show in Grand Rapids, Michigan, Civic Auditorium, May 5, 6, and 7.

Outstanding features of the new machine, which embodies all of the latest and most advanced engineering, are: high speed rubbing with coated abrasives, rubbing compounds or wax; automatic, adjustable beam travel for depth; automatic, adjustable horizontal travel for length or rubbing stroke; vertical beam adjustment for height;

AIR HOSE CONNECTOR

A new, compact, quick detachable air connection, said to provide almost complete free flow of air to air-powered tools, is announced by the Binks Manufacturing Co. of Chicago. Binks claims that this new Q-D connection, which is recommended for the air hose coupling on paint spray guns and other air-operated equipment, slashes pressure drop at the connection to only 5%. The important significance of this fact, the maker points out, is that repeated laboratory tests on other standard quick-detachable connections show pressure drops at the connection "bottleneck" ranging from 21-1/3 to 57-1/3%.

Other advantages claimed by the manufacturer for this new Q-D connection include full 360-degree swivel action. No longer must the operator twist the air hose, which is difficult when the hose is under pressure. The spray gun or other tool can be rotated on the base to bring it into position.

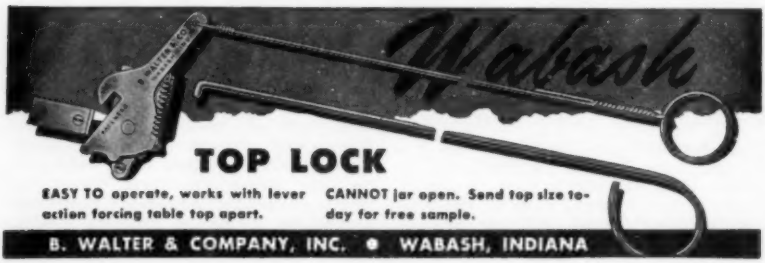
ALEXANDER DODDS COMPANY
451-453 Monroe Ave., N.W.
GRAND RAPIDS :: MICHIGAN

GRINDING MACHINE FOR CUTTER KNIVES

The new Hawker cutter knife grinding machine brings machine tool precision to the grinding of compound curved, as well as straight edged, cutter knives. The new grinder permits exact duplication of grinding angles knife after knife, a most important advantage where knives must be ground in matched sets in order to do best work.

Knives are fastened to a knife holding fixture, and presented to the cutting wheel by means of two hand-controlled lead screws, for perfect accuracy. The knife holding fixture is indexed to permit a presetting of the proper blade angle. This adjustment may be locked, so that all knives in a set may be ground to the same angle without guesswork.

The grinder, complete with motor, weighs approximately 50 lbs., and may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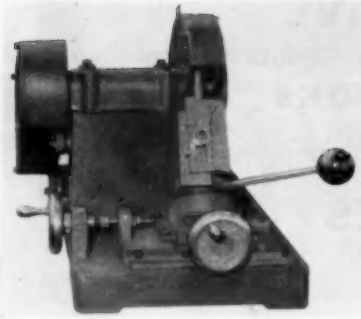
TOP LOCK
EASY TO operate, works with lever action forcing table top apart.
CANNOT jar open. Send top size today for free sample.
B. WALTER & COMPANY, INC. • WABASH, INDIANA

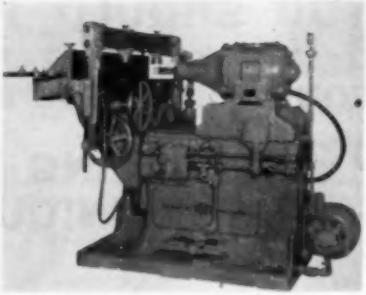


be set on a workbench, without need of being bolted down. The standard grinders comes equipped with a special grinding wheel best suited to grinding curved knives.

For further detailed information, write to the Hawker Manufacturing Co., 1449 Keowee Street, Dayton 4, Ohio.

HYDRAULIC FEED MORTISER

The B. M. Root Co., York, Pa., is offering the D220 heavy duty hydraulic feed mortiser. The machine has a maximum chisel capacity of 1⅝". The table can be indexed by a hand wheel across the front of the chisel so that rectangular slots can be cut as well as single square holes. This hand wheel is also useful for locating single square holes, as it allows easy indexing of the stock in front of the chisel. The stock is clamped by powerful hydraulic bar type

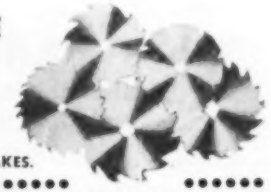


hold-down which is opened and closed by a throw lever.

Other features include stepless rate of feed, continuous feed, intermittent feed, foot control station to start, stop or reverse chisel travel at any point of feed or return stroke. All controls and adjustments can be reached by the operator from his normal position.

Courage is grace under pressure.
Ernest Hemingway

CARBIDE TIPPED SAW BLADES



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DIA	TEETH	ARB	PRICE
6"	12		$12.95
6"	18		16.45
7"	12		13.35
7"	18		16.95
8"	8	½, ⅝	11.95
8"	12	½, ⅝	13.85
8"	20	½, ⅝, ¾	18.25
9"	22		19.65
10"	8	⅝, ¾	17.85
10"	24	⅝, ¾	34.50
12"	24	¾, 1	37.50

Specify make of saw when ordering

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Greenlee Tool Co., page 2, Catalog 34-M.
Forest City Bit & Tool Co., page 74, Catalog.
Alexander Dodds Co., page 214, Literature.

CLAMPS
Adjustable Clamp Co., page 68, Catalog.
J. L. Taylor Mfg. Co., page 72, Catalog.
The Cincinnati Tool Co., page 118, Catalog.
Hartford Clamp Co., page 179, Catalog.

CONVEYORS
C. O. Porter Mach. Co., page 27, Literature.

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DOWEL MACHINES
Hawker Mfg. Co., page 3, Manual.

DRY KILNS
Moore Dry Kiln Co., page 34, Bulletin 5305.
Standard Dry Kiln Co., page 104, Catalog.

DUST CONTROL SYSTEMS
Aget-Detroit Co., page 134, Catalog.

EDUCATION
Kiln Institute, page 106, Folder.

ELECTRON TUBES
Machlett Laboratories, Inc., page 164, Literature.

FACTORY TRUCKS
Nutting Truck & Caster, page 178, Literature.

FASTENERS
Southern Screw Co., page 171, Catalog.

FINISHING MATERIALS & SUPPLIES
Maas & Waldstein Co., page 14-15, Sample.
Binks Mfg. Co., page 119, Catalog.

GLUING EQUIPMENT
Black Brothers Co., page 6, Bulletin 11-1.
Union Tool Corp., page 108, Booklet.

HIGH FREQUENCY BONDING EQUIPMENT
Radio Receptor Co., page 144-145, Bulletin WD-36.

HOGS
Wm. Patent Crusher & Pulverizer Co., page 31, Brochure.

HUMIDIFYING EQUIPMENT
Armstrong Machine Works, page 153, Bulletin.

MATCHER HEADS
Samuel S. Shimer, page 135, Catalog.

MOULDERS
Dependable Machine Co., page 167, Bulletin C-12.

PLANERS & SURFACERS
Oliver Machinery Co., page 1, Bulletin 170.
Yates American Mach. Co., page 48-49, Catalog.
Buss Machine Works, page 159, Bulletin 61.

PINNERS & TACKERS
Powernail Co., page 50, Booklet.

PLYWOOD PRESSES
The Lodge & Shipley Co., page 136, Bulletin HP-2.
Fjellman & Winther, page 165, Catalog.

PORTABLE ELECTRIC TOOLS
Black & Decker Mfg. Co., page 57, Catalog.

SAFETY EQUIPMENT
Willson Products, Inc., page 130, Bulletin.

SANDING MACHINES & EQUIPMENT
Beach Mfg. Co., page 4, Folder.
H. B. Smith Machine Co., page 7, Literature.
National Air Sander, page 13, Catalog.
Supreme Woodworking Mach. Corp., page 30, Circular.
Yates American Mach. Co., page 48-49, Catalog.
Merit Products, Inc., page 99, Catalog.
Sand-Rite Mfg. Co., page 161, Literature.

SAW BLADES, SAWING MACHINE & EQUIPMENT
Mereen-Johnson Machine Co., page 24-25, Bulletin 600-700.
Yates American Machine Co., page 48-49, Catalog.
The L. S. Starrett Co., page 63, Bulletin.
Wardwell Mfg. Co., page 87, Bulletin.
Paddock Tool Co., page 109, Literature.
Foley Mfg. Co., page 122, Booklet.
Moak Machine & Tool Co., page 219, Booklet.
Tannewitz Works, page 215, Circular.

SHAPERS
Baxter D. Whitney & Son., Inc., page 9, Bulletin D8.
Boice-Crane Co., page 120, Literature.

SHAPER STEEL
Wisconsin Knife Works, page 224, Catalog.

TABLE EQUIPMENT
B. Walter & Co., page 214, Sample.

TENONERS
Mereen-Johnson Machine Co., page 24-25, Bulletin 600-700.
Greenlee Bros. & Co., page 174, Bulletin 545.

WOODWORKING, general
Woodworkers Tool Works, page 108, Catalog.

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Abrasive Renewing Compound, 100
Abrasives, 21, 26, 79, 94, 112-113

Band Saw Guides, 169
Bits, machinery, 2, 60-61, 64, 204, 211
Boring Machines, 2, 22-23, 41, 59

Chucking Machines, 59
Clamps, 68, 72, 118, 179
Conveyors, 27
Countersinks, 2, 74
Cutters, 203, 224
Cutter Heads, 47, 65, 138

Dimension Stock, 102, 172
Door Hangers, 192
Dovetailers, 67
Dowel Machines, 3
Drills, 74
Dry Kilns, 34, 104
Dust Control Systems, 37, 64, 134, 200

Education, 166
Electron Tubes, 164

Fastener Driving Equipment, Inside Front Cover, 43, 66, 205
Fasteners, 135, 147, 171, 179, 180
Feeds, 161
Finishes, 123

Glue Mixers, 6, 57
Glue Room Equipment, 6, 57
Glue Spreaders, 6, 168
Glues, animal, 18-19
Glues, casein, 10-11, 45, 80-81, 176-177
Glues, resinous, 10-11, 38, 45, 93, 176-177
Glues, resorcinol, 29, 45
Goggles, 130
Grinders, 213

Handscrews, 72
Hardboard, 73, 88
Hardboard Equipment, 149
Hardware, 192
High Frequency Bonding Equipment, 8, 32, 144-145
Hogs, 31, 85, 210
Humidifying Equipment, 153

Jointers, 22-23, 48-49, 221

Knives, 60-61, 107, 125, 211, 224

Lathe, 48-49
Lathes, back knife, 9
Lumber, 102, 114, 161, 178
Lumber Cores, 163

Matcher Heads, 135
Matchers, 60-61, 92, 101, 207
Moisture Meters, 204
Molders, 22-23, 62, 92, 167, 183, 208-209
Mortise Chains, 110
Mortisers, 48-49, 221, Inside Back Cover

Nailing Machines, 86

Paint, 14-15
Planers, 1, 9, 101, 159, 207, Inside Back Cover
Planes, 91
Plow & Bore Machine, 108
Plywood, 143, 157, 166, 178
Plywood, molded, 160
Polishing Heads, 111
Portable Electric Tools, 57, 91
Presses, hardboard, 149
Presses, laminating, 149
Presses, plywood, 136, 149, 165

Redwood, 12
Resaws, 60-61
Resins, 176-177
Rivets, 180
Rough Mill Systems, 27

Safety Equipment, 130
Sanders, automatic stroke, Outside Back Cover
Sanders, belt, 161
Sanders, block, 103
Sanders, contour, 99, 161
Sanders, disc, 48-49, 161
Sanders, drum, 7, 103
Sanders, edge, 103
Sanders, endless bed, 4, 7, 30
Sanders, portable, 13, 57
Sanders, scroll, 103
Sanders, spindle, 48-49
Sash Pinners, Inside Front Cover, 43, 50, 66
Sash Relisher, 108
Saw Blades, band, 63
Saw Blades, carbide, 215
Sawdust Burner, 121
Saw Gauges, 215
Saw Sharpeners, 83, 87, 124, 163
Saws, band, 22-23, 207, 219
Saws, chain, Inside Back Cover
Saws, cutoff, 24-25, 181
Saws, mitre, 28
Saws, tilting arbor, 28
Saws, variety, 46
Saw Tables, 219
Screwdrivers, 57
Screws, 135, 171
Shapers, 9, 22-23, 120, 219
Shaper Collars, 84
Shaper Steel, 84, 224
Special Machines, 205
Spray Equipment, 119
Spray Guns, 119
Stackers, lumber, 34
Stapling Machines, Inside Front Cover, 13
Steel Strapping, 20
Surfacers, 1, 221

Table Equipment, 15, 214
Table Slides, 15
Tackers, Inside Front Cover, 13, 66
Tack Rags, 124
Teenuts, 147
Tenoners, 24-25, 163, 174, 207, Inside Back Cover
Trucks, factory, 178

Veneer, 14, 143, 161, 162, 172
Veneer Banding Press, 170
Veneer Clipper, 155
Veneer Dryer, 155
Veneer Equipment, 155, 172
Veneer Jointer, 172
Veneer Lathe, 155
Veneer Tables, 162

Wood Cement, 163
Wood Parts To Order, 151

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Medium Duty HAND JOINTER

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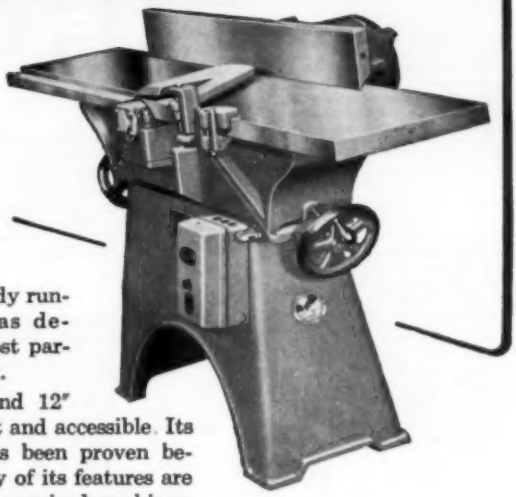

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Index to Advertisers

A

AAA Saw & Tool Service & Supply Company 188-189
Abrasive Products, Inc. 79
Adhesive Products Corporation 163
Adjustable Clamp Company 68
Aget-Detroit Company 134
All-Wood Manufacturing Company 163
American Machine & Foundry Company (DeWalt, Inc.) 46
American Machinery & Motor Co., Inc. 195
American Pulverizer Company 210
Amos-Thompson Corporation 161
Arcata Redwood Company 12
Armour and Company 18-19-26
Armstrong Machine Works 153
Associated Plywood Mills, Inc. 157
Atlantic Lumber Company 114

B

Bass, Rudolf 215
Beach Manufacturing Company 4
Behr-Manning Corporation 112-113
Bell Machine Company 59
Bickler Company, Edgar G. 197
Billstrom, Inc., Nels J. 185
Binks Manufacturing Company 119
Black & Decker Mfg. Company 57
Black Bros. Company, Incorporated 6
Boice-Crane Company 120-187
Borden Company 176-177
Boshco, Inc. 187
Bradley Lumber Company of Arkansas 102
Buckeye Wood Working Equipment Co. 189
Buss Machine Works 159

C

California Redwood Association 12
Cincinnati Tool Company 118
Clamp Nail Company 179
Click, Mrs. A. Graham (Veneer Tables) 162
Clifton Machinery Company 185
Coe Manufacturing Company 155

D

Day Company 121
Delta Millwork Manufacturers 188
Dependable Machine Company 167
Detroit Edge Tool Company 125
Detro Manufacturing & Sales Company 124
DeWalt, Inc. (American Machine & Foundry Company) 46
Diehl Machine Works, Inc., G. M. 16-17-47
Dodds Company, Alexander 214
Doig, Incorporated, Wm. S. 86

E

Ekstrom, Carlson & Company 41
Electronic Heating Corporation 8
Ervin Machinery Company 193

F

Fader & Company, A. L. 193
Fastener Corporation 43
Fay & Egan Company, J. A. 22-23-185-190
Fenton & Company, Randall 184
Festo Woodworking Machines, Inc. 183
Field Company, Wm. H. 110
Finwood Industries, Inc. 166
Fjellman & Winther 165
Foley Manufacturing Company 124
Forest City Bit & Tool Company 74

G

Gamble Brothers Inc. 172
Gaynes Engineering Company 194
Glass City Sales & Supply 190
Globe Machine Mfg. Company 170
Grant Pulley & Hardware Corp. 192
Greenlee Brothers and Company 174
Greenlee Tool Company 2
Grinding & Polishing Machinery Corp. 111
Gustafson & Scott Mfg. Company 196

H

Hackett Company, J. Lee 187-190-191
Hanchett Manufacturing Company 83
Harrington, Incorporated, S. W. 184
Harris Machinery Company 188
Hartford Clamp Company 179
Hart Woodworking Machine Co., Earle 188
Haskew & Company, R. K. 187
Hawker Manufacturing Company 3
Heyer Sales & Engineering Co. 149
Hill Brothers Veneer Company 162
Hoge & Co., Wm. L. 196
Hotel Rosslyn 182

I

Irvington Machine Works, Inc. 181

J

Jacksonville Blow Pipe Company 85
Jamestown Veneer & Plywood Corp. 143
Joa, Curt G. (Jenkins Machinery Co.) 189
Jones & Orth Cutter Head Company 138

K

Kenner, L. R. 185
Kirk & Blum Manufacturing Co. 37
Klok Institute 106
Koppers Company, Inc. 29

L

Land, Incorporated, L. J. 188
Larson Plywood Company 160
Lodge & Shipley Co. (Columbia Div.) 136
Lundberg, David V. 185

M

Maas & Waldstein Company 123
McDonald Machinery Company 194
M and M Woodworking Company 12
Machine Tool & Engrg. Corp. 62
Machlett Laboratories, Inc. 164
Marion Machine Company 67
Mattison Machine Works ..... Back Cover
Meisler Machinery Company 189
Mereen-Johnson Machine Company 24-25
Merit Products Inc. 99
Midwest Abrasive Company 94
Millbury Machine Company 163
Minnesota Mining & Mfg. Co. 21
Mock Machine and Tool Company 219
Moisture Register Company 204
Moline Paint Manufacturing Co. 100
Monticello Novelty Company 190
Moore Dry Kiln Company 34

N

National Adhesives 10-11
National Air Sander, Incorporated 13
National Casein 80-81
Nelson Company 93
Newman Machine Company, Inc. 101
Northern Hardwood Veneers, Inc. 178
Northern Redwood Lumber Co. 12
Northfield Foundry & Machine Co. 221
Nutting Truck & Caster Co. 178

O

Oakley Company 158
Ohio Blow Pipe Company 64
Oliver Machinery Company 1
Oregon Lumber Company 88
Owens-Illinois Plywood Co. 190

P

Pacific Lumber Company 12
Paddock Tool Company 169
Pearson Sanding Machine Company 103
Perkins Glue Company 45
Porter-Cable Machine Co. 91
Porter Machinery Company, C. O. 27
Power & Company, L. 207
Powermatic Machine Company ..... Inside Back Cover
Powernail Company 50
Powers Wire Products Co. 66

R

Radio Receptor Company (Thermatron Division) 144-145
Rockford Screw Products Company 135
Rockport Redwood Company 12
Rohm & Haas Company 38
Root Company, B. M. 197

S

Sand-Rite Manufacturing Company 161
Saranac Machine Company 205
Saw & Knife Specialty Company, Inc. 211
Schmidt & Company, Inc., Chas., G. G. 84
Shimer and Sons, Samuel J. 135
Siempelkamp & Co., G. 149
Signode Steel Strapping Co. 20
Smith Machine Company, H. B. 7
Smithway Machine Company 92
South Chester Corporation (Southco Division) 180
Southern Screw Corp. 171
Speed-Address 189
Spotnails, Inc. ..... Inside Front Cover
Standard Dry Kiln Company 104
Starrett Company, L. S., The 63
Stem, Incorporated, Chester B. 14-188
Sturbridge Yankee Workshop 189
Supreme Wood Working Mchy. Corp. 30
Sutton Woodworking Machine Company 199
Swift Associates, Wesley K. 73

T

Tannewitz Works 28-215
Taylor Manufacturing Co., James L. 72
Taylor, Stiles & Company 107
Texas Forest Service 185
Thayer Company, W. W. 187
Thermatron Division (Radio Receptor Company) 144-145

U

Union Lumber Company 12
Union Tool Corp. 168
United-Carr Fastener Corporation 147
Used and Rebuilt Machinery 184

V

Velepec Co., Fred M. 65
Virginia Machine Tool Co. 203

W

Walter and Company, Inc., B. 15-214
Wardwell Manufacturing Company 87
Web Machinery Company 185
Webb, Inc., David R. 172
Weldon Flinchbaugh & Co. 170
Westinghouse Electric Corp. 32
Weyerhaeuser Sales Company 151
Whitney and Son, Inc., Baxter D. 9
Wilco Machine Works 149
Williams Patent Crusher & Pulverizer Company 31
Willits Redwood Products Co. 12
Willson Products, Inc. 130
Wimbrow, C. Ercell 187
Wisconsin Knife Works 224
Wolf Creek Timber Company 12
Woods Machine Company, S. A. 208-209
Woodward Machinery Company 188
Woodworkers Tool Works 108

Y

Yates-American Machine Co. 48-49-60-61
Young & Bertke Company 200

Z

Zeiller & Nagel, Incorporated 163

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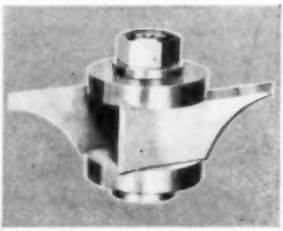

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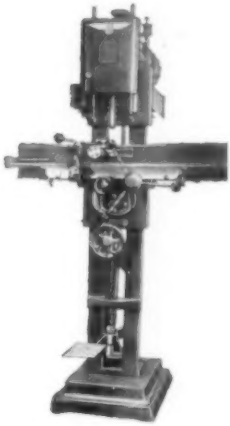

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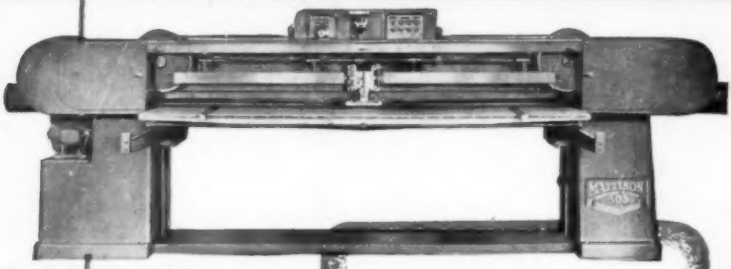
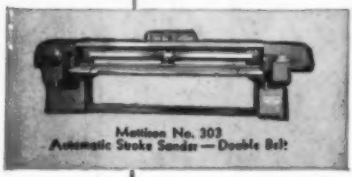
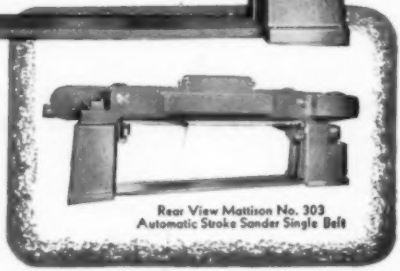


Front View Mattison No. 303
Automatic Stroke Sander — Single Belt



Mattison No. 303
Automatic Stroke Sander — Double Belt



Rear View Mattison No. 303
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